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ANALYSIS OF FEDERAL PROGRAMS AFFECTING SOLID WASTE GENERATION AND RECYCLING.

SCS Engineers

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ANALYSIS OF FEDERAL PROGRAMS AFFECTING SOLID WASTE GENERATION AND RECYCLING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SOLID WASTE RESEARCH LABORATORY

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Agencies of the Federal government have been assigned the responsibility of carrying out many programs, some of which affect either the generation or recycling of solid wastes throughout the country. The effects on solid waste generation and recycling of most of the approximately 1,000 Federal agencies are minimal or nonexistent; however, some of the Agencies' programs have a very direct effect. The 12 agencies identified as having the most influence are the subject of this report. In addition to determining the extent of the respective agency influences, the report contains several specific recommendations for improving the Federal role in national solid waste management.

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FEDERAL PROGRAMS AFFECTING
SOLID WASTE
GENERATION AND RECYCLING

SCS ENGINEERS
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this report for the
Solid Waste Research Laboratory of the
National Environmental Research Center, Cincinnati,
under Contract No. EHS-C-71-0106

U.S. Environmental Protection Agency
Office of Research and Monitoring
National Environmental Research Center, Cincinnati

1972

REVIEW NOTICE

The Solid Waste Research Laboratory of the National Environmental Research Center, Cincinnati, U.S. Environmental Protection Agency, has reviewed this report and approved its publication. Approval does not signify that the contents necessarily reflect the views and policies of this laboratory or of the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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ABSTRACT

Agencies of the Federal government have been assigned the responsibility of carrying out many programs, some of which affect either the generation or recycling of solid wastes throughout the country. The effects on solid waste generation and recycling of most of the approximately 1,000 Federal agencies are minimal or nonexistent; however, some of the Agencies' programs have a very direct effect. The 12 agencies identified as having the most influence are the subject of this study. Specifically, they are:

Office of Tax Analysis, Treasury Department
Federal Highway Administration
Federal Trade Commission
Forest Service, Department of Agriculture
General Accounting Office
Interstate Commerce Commission
National Bureau of Standards, Department of Commerce
Office of Community Development, Department of Housing and Urban Development
Department of Defense, Defense Supply Agency
United States Postal Service
Property Management and Disposal Service, General Services Administration
Public Building Service, General Service Administration

In addition to determining the extent of the respective agency influences, the report contains several specific recommendations for improving the Federal role in national solid waste management.

FOREWORD

To find, through research, the means to protect, preserve, and improve our environment, we need a focus that accents the interplay among the components of our physical environment - the air, water, and land. The missions of the National Environmental Research Centers - in Cincinnati, Research Triangle Park, N. C., and Corvallis, Ore., - provide this focus. The research and monitoring activities at these centers reflect multidisciplinary approaches to environmental problems; they provide for the study of the effects of environmental contamination on man and the ecological cycle and the search for systems that prevent contamination and recover valuable resources.

Man and his supporting envelope of air, water, and land must be protected from the multiple adverse effects of pesticides, radiation, noise, and other forms of pollution as well as poor management of solid waste. These separate pollution problems can receive interrelated solutions through the framework of our research programs - programs directed to one goal, a clean livable environment.

This document, published by the National Environmental Research Center, Cincinnati, reports on a study of the activities of 12 Federal agencies whose programs and policies might influence solid waste generation and recovery. Having the Federal government consistently identified with sound solid waste practices is important, and this report and its recommendations will be of especial interest to workers concerned with environmental pollution and to the agencies involved.

ANDREW W. BREIDENBACH, Ph.D.
Director, National Environmental
Research Center, Cincinnati

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ACKNOWLEDGEMENTS

This work effort, initially involving a review of all Federal agencies and later 12 specific agencies, would have been an impossible task without the assistance of many government and private industry representatives. We have included as Appendix I a tabulation of those persons who collaborated with the study team in this research work. Their assistance and support is gratefully acknowledged.

We are pleased to acknowledge those persons providing continuing assistance throughout the execution of the project. Mr. Harry Freeman, Project Officer, Environmental Protection Agency (EPA), not only provided direction and guidance, but gave invaluable support during the preparation and review of the final report. His assistant, Mr. Richard Ongerth, also aided the study team. Mr. John Hill, EPA, provided necessary interagency liaison assistance while gathering information in the Washington, D.C. area. Mr. Eric Zausner, of the Council on Environmental Quality also assisted the study team.

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SUMMARY AND RECOMMENDATIONS

National interest in environmental matters in general and in resource recovery in particular has increased in recent years. The Environmental Protection Agency (EPA) recognized that Federal efforts aimed at controlling solid waste generation and encouraging waste recovery and refuse would be enhanced if all Federal agencies operated under policies and regulations that were in concert with national environmental goals. Consequently, this study was inititated to determine those Federal Government programs and policies that might influence solid waste generation and recovery and to identify the policies that are counter to resource conservation and recovery goals. The study was a relatively brief review of Federal practices.

Summary

This report presents the results of a 9-month investigation during which the effects of Federal activity on solid waste generation and resource recovery were studied. A preliminary survey was made of all Federal agencies and their possible influences on solid waste generation and recycling. The vast majority of the approximately 1,000 Federal agencies had little or no influence on solid waste generation and resource recovery. Forty-nine agencies with policies or regulations that had or could have an effect on the generation or recovery of solid wastes were identified.

Based on results of the initial study, the following 12 agencies were selected by EPA for further study.

- Office of Tax Analysis, Treasury Department
- Federal Trade Commission
- Forest Service, Department of Agriculture
- General Accounting Office
- Interstate Commerce Commission
- National Bureau of Standards, Department of Commerce
- Office of Community Development, Department of Housing and Urban Development
- Department of Defense, Defense Supply Agency and selected aspects of the Department of the Air Force and Department of the Army.

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- United States Postal Service
- Property Management and Disposal Service, General Services Administration
- Public Building Service, General Services Administration

Agency policies and programs do influence solid waste generation or resource recovery, or both. However, surprisingly few agency policies were found that had a major effect on the generation of solid waste or inhibited recovery. Conversely, most agencies had policies and practices in effect to encourage resource conservation and waste reclamation. The more significant influences are discussed in the report.

Recommendations

Many Federal policies and regulations affect solid waste generation and recycling to varying degrees. Certain policy changes could enhance the possibilities for recycling and/or could discourage waste generation. In some cases the basic laws administered must be altered to more positively influence resource recovery efforts. Some agency influences on solid waste recycling and generation are too complex to judiciously develop recommended policy changes based on this brief study. Additional work is required for these agencies in order to make specific recommendations. The following recommendations are consolidated from the body of the report. Other recommendations for each agency studied are included within the report.

- Federal tax provisions allowing special treatment of income derived from virgin resource development should be altered so that secondary material recovery and processing receives equivalent tax treatment. The marketability of secondary materials should be enhanced by this action.
- The Tax Reform Act of 1969 should be clarified and/or revised to include solid waste as well as air and water pollution control facilities and to allow accelerated depreciation on facilities intended to reclaim resources from solid wastes.
- The Interstate Commerce Commission should determine the influence of freight rates on secondary material movement, sales, and corresponding degree of resource recovery. Insufficient evidence exists to indicate whether present freight rate differentials actually impede the recovery of solid waste materials.
- In those Federal activities requiring the preparation of an environmental impact statement, consideration should be given to anticipated solid waste generation, and alternatives for waste reduction, reuse and recovery.
- The Forest Service should periodically revise its tree-cutting specifications and regulations to reflect technological advances so as to increase yield from the harvested logs, use other parts of the felled or down timber, and otherwise reduce the quantity of waste residue.

- The Office of Community Development should more actively cooperate with the Federal Highway Administration so that demolition rubble generated in the course of urban renewal work can be incorporated whenever practical into highway embankments.

- More study is required to establish the following:
  - The type and advisability of special income tax incentives to encourage resource recovery.
  - The effectiveness of the property management systems in the civilian and military sectors. Indications are that possibly solid waste generation may be reduced and additional materials recovered if improved controls were instituted and/or existing provisions more closely controlled.

CHAPTER I

INTRODUCTION

Background and Purpose

The decade of the seventies has brought increased public and governmental concern for the quality of the environment and conservation of resources. In the Declaration of National Environmental Policy (National Environmental Policy Act of 1969, Public Law 91-190), Congress stated that the Federal Government should use all practical means to enhance the quality of renewable recycling of depletable resources.[1] President Nixon, in his message on the environment in 1970, stated, "One way to meet the problem of solid waste is to simply surrender to it . . . . Our goal must be broader: To reduce the volume of wastes and the difficulty of their disposal and to encourage their constructive reuse instead."[2]

However, some existing Federal policies and regulations may have a counterproductive influence, thereby impeding progress toward the commendable goals expressed by the President. Existing policy often exemplifies the "unlimited resources" thinking of our country's earlier "frontier" years. Federal agencies, in carrying out their respective responsibilities, establish regulations, policies, and controls, that in addition to their expressed purpose, may have a secondary effect on the generation or reclamation of solid wastes.

Accordingly, the Environmental Protection Agency (EPA) authorized this brief study to identify laws, rules, regulations, and practices that were instituted without consideration of the effect on solid waste generation and recovery. The priorities of the seventies, including a clean environment and the rational use of limited natural resources, should not be prevented from realization because of antiquated Federal laws and policies.

This report presents the results of a 9-month study undertaken to determine and analyze the effect of ongoing Federal activities on solid waste generation and recycling. Time constraints limited this study to a brief coverage of Federal programs. This is especially true of the larger and more complex agencies, particularly the Department of Defense.

Approach

All major Federal Government agencies were surveyed to determine those policies, laws, and regulations that in some way may add to the generation of solid waste and/or discourage the recovery of usable solid waste constituents. Forty-nine agencies administering such policies and regulations were identified. A brief description of how their activities affected solid waste generation and reclamation was provided in an earlier unpublished report to the EPA, together with a complete bibliography of all documents, periodicals, and other references used.

Based on results of the initial work, the EPA selected the following 12 agencies for further study.

- Office of Tax Analysis, Treasury Department
- Federal Highway Administration, Department of Transportation
- Federal Trade Commission
- Forest Service, Department of Agriculture
- General Accounting Office
- Interstate Commerce Commission
- National Bureau of Standards, Department of Commerce
- Office of Community Development, Department of Housing and Urban Development
- Department of Defense, Defense Supply Agency, and selected aspects of the Departments of the Air Force and Army.
- United States Postal Service
- Property Management and Disposal Service, General Services Administration
- Public Building Service, General Services Administration.

During an ensuing 3-month period, project staff met with agency representatives in the Washington, D. C. area. Representatives of numerous industrial associations and other pertinent organizations were also interviewed to further explore agency influences or impacts on solid waste generation and recycling. Quantitative data indicating the extent of agency influence were gathered when available.

CHAPTER II

OFFICE OF TAX ANALYSIS
TREASURY DEPARTMENT

Abstract

Income tax treatment varies between industries just as between individuals. Certain tax provisions give special treatment to those businesses mining virgin resources from the land. An entrepreneur who "mines" resources from solid waste, however, is not entitled to similar tax treatment. Since the resources, regardless of origin, must ultimately compete for buyers, these tax laws discourage resource recovery efforts by inhibiting their potential profitability.

Other aspects of the tax law also influence resource recovery efforts. For example, municipal solid waste disposal operations are tax exempt. A business engaged in recovering materials from solid wastes is taxed on any profits. In an evaluation of relative economics, this factor favors a decision to discard solid wastes rather than attempting to recover reusable portions.

Accordingly, the Federal tax structure, as delineated in the Internal Revenue Code, was studied. The Office of Tax Analysis furnishes technical support in development of proposed changes in the tax law.

Background

Taxes are the major source of operating revenue for the Federal Government. Annual income tax revenues from corporate and individual sources currently approximate $130.4 billion. Excise tax revenues currently approximate $17.5 billion annually.[3]

Taxes have pronounced effects on economic activity, since many businesses and individuals base important decisions upon tax code provisions. The original intent of taxation was the generation of revenue. Today, however, the tax structure is also used to change national economic policies and to encourage activities that appear beneficial to the Nation. For example, natural resource development and industrial modernization are encouraged by favorable tax policies. Thus, the Federal tax structure can be used to attain apparently beneficial social and economic goals that are not directly related to revenue needs.

Role of the Office of Tax Analysis. The Office of Tax Analysis was chosen for study because of its role of advising and assisting the Secretary of the Treasury on tax policy issues. Among other functions, the Office investigates the probable effects of proposed tax measures and the actual effects of existing tax legislation. Therefore, this Office was in an excellent position to advise on the role of Federal taxes in relation to the national solid waste problem.

The role of the Office of Tax Analysis is only investigatory and advisory. Changes in tax laws can be made only by Congress, and by the courts through interpretive decisions. As an arm of the Executive Branch, the Treasury Department develops tax proposals and policies that are sent to Congress for approval. The Internal Revenue Service (IRS), Treasury Department, is charged with implementing tax laws, assessing taxes, and collecting monies.

There are two aspects of tax law discussed herein: (1) the effect of present tax laws on solid waste generation and reclamation and (2) the possible changes that could be made to reverse undesirable conditions.

A source for major portions of the information in this chapter was a paper prepared for the Council on Environmental Quality by Mr. Richard E. Slitor of the Office of Tax Analysis.[4]

Encouragement of Use of Virgin Resources

The Internal Revenue Code affords tax advantages to developers of virgin raw materials. Similar advantages or incentives are not now available to those who are engaged in recovering secondary materials. Three main provisions in the Code are detrimental to resource recovery: (1) Depletion allowances; (2) development expense exemptions; and (3) capital gain treatments. These are discussed below.

Depletion Allowances. From the inception of the income tax, Congress has indicated its desire not to tax capital gains as highly as ordinary income. Thus, the individual capital gains tax rate does not exceed 25 percent (increasing up to 35 percent for amounts over $50,000) regardless of the individual's bracket for normal income tax. In addition, owners of extractive businesses, such as ore mines, oil wells, and timber stands, are allowed a tax credit for a portion of their income derived solely from their properties. This credit is in recognition that part of what apparently was ordinary income is a return on invested capital or a capital gain. For example, when a ton of coal is sold, the excess of what was received from the cost of mining that ton "is by no means all income; part of that excess must be treated as a repayment of what was invested in the mine from which the coal was taken . . . "[5] The special tax credit allowed to extractive industries for this type of income is known as a depletion allowance.

There are two types of depletion allowances used by industry in reducing its income taxes: cost depletion and percentage depletion allowances. The cost depletion allowance is computed by dividing the estimated total number of recoverable units in the deposit (i.e., tons of ore, barrels of oil, etc.) into the original cost of the property less all previous depletion allowances (called the adjusted basis) and multiplying the resulting rate per unit (depending on the accounting system used) by either the number of units for which payment is received during the tax year, or by the number of units sold.[6] Cost depletion deductions cease when the adjusted basis of the property reaches zero. An example of a cost depletion allowance calculation is given below.

If the owner of a timber stand paid $10,000 for the timber and $8,000 for the land, his tax basis for the timber would be $10,000 (cost of the timber). If there was 1 million board-feet on the land, the depletion unit would be $10 per thousand board-feet. If he felled 500,000 board-feet of timber in 1 tax year, his depletion allowance would be $5,000.[7] This $5,000 can be deducted from net income before taxes.

To determine the percentage depletion allowance, a percentage (ranging from 5 to 22 percent, depending on material mined or otherwise extracted) is multiplied by the gross income from the property for the tax year. The only restriction is that the deduction calculated under this method cannot exceed 50 percent of the taxable income without depletion allowances.[8] A sampling of applicable materials and their corresponding percentages is given below.

Material	Depletion (percent)
Sulphur, uranium, lead, nickel	22.0
Oil and gas	22.0
Gold, silver, copper, iron ore	15.0
Coal, sodium, chloride	10.0
Clay (for sewer pipe or brick)	7.5
Clay (for pots, roofing tile), gravel, sand	5.0
Most other minerals and metallic ores	14.0

Percentage depletion allowances are not applicable to timber harvesting; only cost depletion allowance is permitted for timber. Mineral extraction operations may apply either percentage or cost depletion allowances, whichever provides the greater deduction. Percentage depletion can be applied as long as the mineral deposit produces, even after the original cost has been completely recovered. In addition to the income derived from the sale of the mineral itself, certain transportation charges and processing steps applied by the mine owner or operator to add value to the mineral for marketing purposes can also be included as part of the gross income to which the percentage depletion rate is applicable. In ferrous metals mining, for example, the costs for sorting, concentrating, sintering, and loading for shipment are all processing steps for which the percentage depletion rate applies. The following is an example of a percentage depletion allowance:

The owner of an iron mine complex had annual gross sales of $20 million. Prior to selling the iron ore, it was transported from the mine to the mill at a cost of $1 million and processed at the mill at a cost of $2 million. The percentage depletion allowance was computed at $3 million ($20 million x 0.15). If the total expenses of the complex, including the owner's transportation and processing costs, were $13 million, the taxable income would be $7 million. Since 50 percent of $7 million is greater than the percentage depletion allowance, the taxable income limitation does not decrease the deduction.

On the other hand, those who reclaim and process secondary materials that compete with virgin materials are subject to normal income tax treatment under the Internal Revenue Code. Income derived from the collection of secondary materials (similar to mining), processing it into an acceptable form (analogous to virgin material treatment and processing), and sale is fully taxable. Herein lies the main alleged tax discrimination favoring new materials. Conversely, it can be argued that the tax advantage afforded new materials reduces the cost of the new material, and this reduced cost carries down to a lower cost for scrap.

Development Expense Exemptions. Costs incurred in developing mineral deposits can be capitalized and subsequently depreciated over several years or taken as current deductions, whichever tax treatment results in a lower tax burden. Qualified development costs include those for mine shafts, tunnels, and stripping when incurred after the presence of minerals has been ascertained. Expenses incurred during an unsuccessful exploration for new domestic resource deposits are completely deductible and not subject to recapture.

Through this mechanism the tax structure encourages exploration for new sources of virgin materials and development of such sources. There is no similar encouragement given to businessmen who develop a source of raw materials from residuals.

Capital Gain Treatments. Owners of timber, coal mines, and iron ore deposits are afforded additional tax benefits. Using timber as an example, a taxpayer who has owned a timber stand for more than 6 months and cuts the timber either for sale or use in his business may treat such a cutting as a sale or exchange. Under this provision, the difference between the original cost of the standing timber and the market value on the first day of the taxable year is treated as a long-term capital gain or loss rather than as straight income. Also, income derived from disposal of standing timber under a cutting contract may be treated as a sale under certain conditions and can also qualify for capital gains treatment. Even though the owner may be a dealer in standing timber, he is permitted capital gains treatment.

The overall impact of this provision on timber, coal and iron ore resource owners is a reduced tax rate since capital gains are taxed at a lower rate than normal income.

Impact on Resource Recovery. The economic effect of tax advantages afforded owners and producers of virgin natural resources is significant. A sizeable tax savings is afforded those industries engaged in extracting new materials from the earth while industries engaged in collecting and processing competing materials from the waste stream must pay normal taxes.

Minerals. Table 1 illustrates the effect of depletion allowances on income for certain extractive industries in 1966.[9] The portion of total revenue generated in the mining industry that was not taxed because of depletion allowances ($1.02 billion) represented 109 percent of the net income after taxes ($0.94 billion). Considering the metal mining industries only, tax-exempt receipts in the form of depletion added about 60 percent to this industry's after-tax income. The corresponding figure for the nonmetallic mineral mining industry was 127 percent. Businesses engaged in resource recovery activities have no corresponding tax deductions that favorably affect their profitability in this manner.

TABLE 1

1966 CORPORATE INCOME TAX ANALYSIS FOR SELECTED MINING INDUSTRIES[9]

(Dollar amounts in millions)

	Total mining	Metal mining	Nonmetallic minerals mining
Total number of returns	14,831	886	3,685
Number of returns with net income	7,284	267	2,323
Total receipts	$14,609	$2,990	$2,681
Total deductions	12,884	2,420	2,546
Depletion*	1,021	209	109
Net income (less deficit)	1,740	576	134
Income tax	832	226	56
Investment credit†	32	10	8
Net income (after taxes)	940	360	86

*Included within total deductions.
†Includes adjustment for constructive taxable income from related foreign corporations.

Table 2, the 1967 income tax analysis for the iron ore mining industry, indicates more specifically the tax advantages provided virgin material suppliers.[10] Overall, the 140 iron ore mining companies submitting income tax returns lost approximately $95 million in 1967, which included $19 million paid in income taxes and $37 million in depletion allowances. The $37 million in depletion allowances claimed by the iron ore industry represented 5.6 percent of the $657 million receipts for the industry. If passed on to customers, this savings could have reduced prices by $0.61 per ton, using the average price for iron ore at the mine of $10.21 per ton in 1967.[11] The average depletion allowance is only about one-third of the maximum percentage depletion allowance, due in part to the above-described limitations. For individual plants that can apply the maximum percentage depletion allowance of 15 percent, and a $10.21 per ton price at the mine, the depletion allowance can reduce the price of iron ore by $1.80 per ton. Thus, although the depletion allowance has the potential to reduce the price of iron ore by as much as $1.80 per ton, the nationwide average would have been $0.61 per ton in 1967.

TABLE 2

1967 INCOME TAX ANALYSIS FOR THE IRON ORE MINING INDUSTRY[10]

*(Dollar amounts in millions)**

Total number of returns	140
Number of returns with net income	29
Total assets	$1,309
Total receipts	657
Total deductions	735
Depletion†	37
Net income (less deficit)	−77
Other special deductions	23
Taxable income	45‡
Income tax	19
Investment credits	1
Net income (less deficit) after taxes	−95

* Figures are rounded to the nearest million dollars and therefore do not add in all cases.

† Depletion included within total deductions.

‡ Although the overall industry lost money, companies within the industry had a taxable income of $45 million.

The percentage depletion allowance can either enhance the after-tax profitability of the iron ore mining industry or reduce the selling price of the product. Either course serves to encourage iron ore production and use. Since ferrous scrap is the only other domestic source of ferrous resources, secondary materials dealers in these commodities are competing for sales with iron ore at a disadvantage of about $0.61 per ton of ore.

Paper. Capital gains treatment afforded to the timber industry, including producers of pulpwood, encourages use of virgin wood fibers in papermaking instead of fibers reclaimed from wastepaper. Due in part to the effect of capital gains treatment, the effective rate of tax on the timber industry's taxable income was 35 percent in 1966, compared with a maximum statutory rate of 48 percent and an effective tax rate of 44 or 45 percent for all industries as a whole.

The effect of these favorable tax treatments on the ultimate sales price of virgin pulp can be estimated. In 1970, 70.3 million cords of pulpwood were produced and sold for an average price of $19 per cord.[12] This corresponds to approximately $24 per ton. Assuming a gross profit margin of 8 percent of sales, or $1.92 per ton, the approximate 10 percent tax savings can amount up to $0.19 per ton due to capital gains treatment alone.

Assuming all of this savings had been reflected in lower prices, the sales price would have to be increased by $0.35 per ton in order for the seller to realize the same after-taxes profit without the capital gains treatment. This simplified example assumes that the market would allow an increase in profit margin from 8 to 9.4 percent of sales.

In addition, IRS figures indicate that in 1967, the 25 largest paper and allied products manufacturers had total receipts of $7.5 billion and used cost depletion allowances of $67 million.[13] As previously indicated, timber harvesting is eligible for cost depletion allowance but percentage depletion does not apply. Thus, depletion accounted for approximately 0.9 percent of receipts, representing an additional potential price reduction of $0.22 per ton (0.9 percent x $24 per ton). Accordingly, suppliers of virgin paper fiber may have passed a $0.57 per ton ($0.35 + $0.22) savings on to consumers.

Many paper manufacturers are large integrated corporations. They not only produce and market paper, but also own and operate the tree farms and forests for needed raw materials. These manufacturing processes are designed to use virgin wood fiber. Tax savings attainable by owners of timber stands were cited by paper manufacturers as one reason for becoming integrated. Hence, the income tax structure further encourages the use of virgin fibers at the expense of secondary wood fibers recovered from solid waste.

Encouragements for Solid Waste Generation

Depreciation Allowances. It has been generally recognized that income tax deductions for depreciated property and investment credits can have the effect of shortening equipment and building lives, although no quantitative estimate was made within the scope of this project. Depreciation schedules are generally developed by the IRS based on the expected useful life for equipment and machinery. Industry often replaces equipment before or soon after its original purchase price has been recovered through depreciation deductions, even though useful life may remain. This practice tends to increase material consumption and also solid waste generation because earlier sale or scrapping of equipment is encouraged. In July 1971 new tax depreciation rules were put into effect to allow businesses to shorten by 20 percent the number of years over which new machinery and equipment may be depreciated. The effect of the new rules is to reduce income taxes on business by 5.8 percent, a reduction of $2.8 billion in 1971 and an average reduction of $3.9 billion over 10 years.

Depreciation allowances and investment credits are not the only factors causing early equipment replacement. Businesses must continually update their operations and replace equipment and machinery as technological advances occur in the industry. Income tax provisions such as depreciation allowances do encourage industrial modernization and equipment replacement to some degree. Some equipment having useful life remaining may be discarded as a result, thus contributing to solid waste generation. The subject of depreciation allowances and their effects is quite complex and cannot be fully discussed within the scope of this study.

Tax Exemption for Municipalities. Resource recovery is presently practiced to a very limited extent in this country, partially because of Federal tax provisions. Most solid wastes are not reclaimed but are discarded at disposal sites. This is particularly true of most municipal solid wastes.

The Internal Revenue Code, in effect, provides incentives to municipalities to establish and operate solid waste collection and disposal activities. These include the following:

- Municipal activities are tax exempt.
- Municipalities can usually borrow funds at relatively low interest rates through tax-exempt securities.
- Local sales, excise, and property taxes, and other sources of operating funds for municipal activities are deductible from individual income taxes.[14]

Municipalities could conceivably operate resource recovery sytems using funds derived from tax-exempt sources. However, the mission of municipal solid waste management system has generally been restricted to protecting environmental health. There has been a hesitancy on the part of local governmental agencies to spend taxpayer money on untried or experimental methods.

Therefore, it has been left to private enterprise to attempt the development and implementation of a system to recover resources from municipal wastes. However, the recovery system must be competitive with municipal or private disposal operations now serving the municipality. The entrepreneur cannot charge a municipality more to reclaim its waste than the city presently pays for disposal, or else the city would wisely choose to continue the present method. But a private entrepreneur competes with the city on unequal footing. He must pay federal income taxes on corporate earnings while the city is under no tax liability. Business must pay the prevailing interest rate on borrowed funds (currently about 7¼ percent) while the city is entitled to preferred treatment (municipal bond interest rates are currently about 5½ percent).[15] Resources recovered by the entrepreneur must be marketed without tax assistance, whereas the municipality may raise operating funds through sources that are deductible for contributors.

Possible Tax Incentives to Achieve Resource Recovery Goals

The use of the Internal Revenue Code to stimulate activity in specific sectors of the economy has long been practiced. Natural resource mining has been encouraged through the depletion allowance. Investment in housing has been more attractive because of beneficial depreciation considerations. In recent years, Congress has indicated its willingness to use the tax laws to stimulate investment in facilities that are designed to protect the environment (see the following section). Therefore, it was beneficial to explore examples of possible tax incentives that would promote action toward solid waste recovery and reduced generation.

It should be noted that these incentives are conjecture only; no quantitative measure of their potential impact was possible without an in-depth economic and technological study. Analysis of potential incentives is also complicated because of multiple ramifications in the economy, both predictable and unforseen, which should be expected.

There are two main avenues by which tax incentives can be implemented: through the excise tax mechanism or through income taxes. Potential incentives will be discussed under each heading.

Excise Taxes. From the standpoint of administration, the imposition of excise taxes to attain environmental ends is preferred, rather than the alteration of the income tax structure. Revenues can be predicted more accurately under the excise tax system, facilitating fiscal planning. Examples of excise taxes that could be imposed to encourage attainment of resource recovery goals are briefly discussed below.

Excise Tax on Use of New Material. Under this plan, an excise tax would be imposed on the production of material, e.g., paper, aluminum, or steel, manufactured wholly from virgin resources. This would increase the price of such materials while competing products made with at least a minimum specified percentage of reclaimed materials would not be taxed. The latter materials would presumably become more competitive in the open marketplace.

There could be many problems associated with the imposition of such a tax, including the following:

- Identification and certification of manufacturers using recycled materials in their products would be difficult to monitor.
- Virgin material producers and users would likely lobby against such a tax.
- The costs for reclaiming enough secondary materials to replace virgin materials in manufacturing may be excessive, thus canceling the price advantage desired.

Excise Tax on Disposable Goods. In order to reduce the total quantity of solid wastes generated, use of consumer goods having a short use life could be discouraged. After an extensive study to establish the expected useful lives of all classes of commodities, or to establish the relative environmental impacts associated with their disposal, appropriate excise taxes could be levied on short-lived and/or problem commodities. This tax would raise the price to consumers of such goods and discourage purchase and use. Of course, the value of the product must also be considered in assessing the proper tax. Theoretical examples of applications of such a tax are as follows:

Commodity	Excise tax (%)
Newsprint and candy wrappers	10
Steel, aluminum, and glass beverage containers	8
Boxboard	7
Auto tires	5
Automobiles	3
Roofing, tile, and wall board	1

These excise taxes could be reduced to lower the product's selling price if the manufacturer indicated that materials reclaimed from solid waste were used in his goods.

Problems associated with such a tax would be similar to those described above for an excise tax on new material. In order to achieve a substantial benefit, in addition raising the revenues, a substitute should be available to replace the short-lived and/or problem commodity. Additionally, recent court decisions tend to discourage attempts to impose such taxes.

Income Taxes. Alteration of the income tax laws to effect a reduction in solid waste generation and an increase in reuse may also be possible. Because of the complex nature of the tax structure, the use of income taxes to change marketplace activity would be a complicated and multifaceted problem. Examples of changes and associated problems are discussed below.

Tax Credits. Those businesses that install processing equipment used in the reclamation of solid waste materials could reduce their tax burden if an income tax credit were allowed for such investments. Tax credits (also called investment credits) allowed in the past for new equipment installation have encouraged industries to expand and modernize their operations. According to a secondary materials industry spokesman, previous tax credits were not in effect long enough to influence widespread expansion in the secondary materials industry. Generally secondary material processors are relatively small and have only one processing facility; consequently, they require a longer period of time to accumulate enough capital to expand and/or modernize. Conversely, companies processing virgin materials are often larger and may have additional capital available for large capital investments during a limited period when investment credits are available.

An investment tax credit specific to or favoring installation of the secondary material processing equipment and/or facilities would be a positive move toward solid waste recovery. Alternatively, the tax law could be amended to allow accelerated depreciation of equipment used in resource recovery efforts. Although accelerated depreciation or tax credits may encourage more rapid discarding of equipment, the net effect of an investment tax credit or accelerated depreciation schedule is expected to benefit expansion of the secondary materials industry and produce positive effects on recycling and reclamation efforts.

Other Incentives to Recycle. If the goals of resource recovery are deemed to be of sufficiently high priority, a tax holiday could be granted to those businesses engaged in solid waste reclamation efforts. A provision to equalize the effects of the depletion allowance afforded to virgin material producers could also prove helpful. This may be achieved by allowing corresponding deductions to waste material processors or by reducing and/or eliminating existing depletion allowances. As another possible tax incentive, extended loss carryovers applicable to those who reclaim and use materials from solid wastes could be instituted.

A graduated income tax reduction could be allowed producers who use varying amounts of secondary material as raw material input to encourage usage of materials recovered and thereby provide a market for reclaimed wastes. This mechanism could be administered through the income tax structure and be similar to an excise tax on virgin material consumption, except a rebate would be given for secondary material usage. However, administration and planning of such a system could be difficult.

The purpose of all these tax incentives is to improve the profitability of the recycling industry and thereby encourage such activity by private enterprise. However, the adoption of such incentives would not necessarily guarantee the achievement of the desired goals. There is the possibility that the costs involved in effectively recovering a significant portion of municipal solid waste are so excessive that even a tax incentive that essentially reduces the cost of equipment to zero would not cause the operation to be profitable. More detailed analyses must be undertaken to determine whether any given tax incentive would actually accomplish increased resource recovery. Impacts of tax policy changes on international trade balances and other indirect effects must also be considered.

As previously stated, consideration of these tax incentives to encourage solid waste recovery is only at the prelimimary stages. There has been some action on related proposals, however, which will be covered in the following section.

Recent and Pending Action

Tax Reform Act of 1969. Three provisions of this most recent amendment to the Internal Revenue Code relate to solid waste generation and recovery.

Industrial Development Bonds. Under the tax statutes, state and local bonds may not be granted tax-exempt status if a major portion of the bond proceeds will be used by a taxable business and/or if repayment of the bonds is secured by payments derived from property used by a taxable business. An exception has been allowed, however, if the bond proceeds are to be used in sewage, air and water pollution, or solid waste disposal facilities. On April 3, 1972, the Internal Revenue Service issued rules that extend this exception to bonds used to finance resource recovery. Thus, an indirect subsidy in the form of lower financing costs is available to persons engaged in waste disposal and resource recovery operations.

Pollution Control Facilities. In order to encourage abatement of pollution, the Tax Reform Act allows a taxpayer to amortize pollution control equipment over a 60-month period rather than the normal 16 years. This accelerated depreciation is applicable only to facilities installed in an existing plant after January 1, 1969, and placed in service before 1975. Only facilities that control air and water pollution are covered by this provision. Sales of material reclaimed as a result of pollution control processing reduce the basis that can be rapidly deducted. This limitation is included to ensure that the accelerated depreciation incentive causes pollution control facilities to be constructed that would not otherwise be profitable or economically feasible. Thus, not only are solid waste recovery operations excluded from this favorable tax treatment, but recovery of salable solids from air and water pollution control facilities has been discouraged.

Building Rehabilitation. Capital expenditures for existing buildings can be written off over a 5-year period under the Tax Reform Act. The original purpose of this tax incentive was to encourage the rehabilitation of slum-type structures and thereby improve housing quality. As a side effect, this incentive also tends to lengthen the useful life of buildings and in this manner reduces, or at least defers, the quantity of demolition waste generated.

H. R. 9906. Introduced in the House of Representatives on July 20, 1971, H.R. 9906 proposes to amend the Internal Revenue Code such that recycled materials are included in the list of materials for which percentage depletion is allowed. Specifically, this bill would provide for a 14 percent depletion allowance for reclaimed materials including recycled minerals, paper, lumber, glass, plastic, and oil, except if a higher rate is provided for the same mineral when produced from natural deposits. This bill presently awaits action in committee.

Such a "depletion allowance" for recycled materials would be difficult to administer since depletion allowance is based on natural resource depletion. There is no known comparable basis on which to calculate a similar deduction for secondary materials. Office of Tax Analysis personnel feel that more investigation and research will be required to ascertain effects of recycling incentives before any Code change can be effected.

H.R. 9906 and other proposed legislation with similar intent serve to bring the issues to public light and are helpful in this respect.

Recommendations

- *Tax treatment that favors virgin resource development should be amended.*

  In response to the recognized need to conserve limited natural resources and to recover the resource value presently wasted, the Internal Revenue Code should be altered to encourage the utilization of recovered resources. The stimulative effects of depletion allowances and special capital gains treatment that are preferential towards natural resource development are discriminatory toward reclaimed material. Corresponding tax advantages should be provided to encourage secondary material recovery, processing, and use, if the advantages afforded virgin resource development are continued in effect.

- *An in-depth study should be undertaken under the joint sponsorship of EPA and the Office of Tax Analysis to determine what additional tax incentives or disincentives would be most beneficial in encouraging resource recovery.*

- *Accelerated depreciation should be available to those who install facilities intended to reclaim resources from solid wastes.*

  Presently, only air and water pollution control facilities qualify for favorable depreciation treatment under the provisions of the Tax Reform Act of 1969. This amendment to the Internal Revenue Code fails to consider solid waste generation as a serious pollution and resource depletion problem. The Act's coverage should be extended.

  Furthermore, the Tax Reform Act presently stipulates that the portion of the cost of a pollution control facility offset by the sale of materials recovered from its operation cannot be subject to accelerated amortization. However, to provide the most effective incentive to recover low value solid wastes that would not otherwise be reclaimed, gross sales of such materials should not reduce the basis upon which rapid depreciation is calculated, but profits should reduce the basis.

It is beyond the scope of this study to determine what specific new tax measures should be adopted. The tax law and its possible effects on resources recovery goals is an extremely complex issue, requiring an extensive investigation. Both direct and indirect effects of new tax provisions must be considered. An in-depth analysis of such factors as recycling technology, secondary material marketing, and economic impact on existing industry, and the balance of payments problem is required before definite income and excise tax incentives are formulated so that the desired resource recovery goals are attained without adverse side effects. EPA and the Office of Tax Analysis personnel are knowledgeable in the specific areas necessary and should jointly support and lead such an investigation.

CHAPTER III

FEDERAL HIGHWAY ADMINISTRATION
DEPARTMENT OF TRANSPORTATION

Abstract

The Department of Transportation (DOT) has responsibility for the development of national transportation policies and programs to provide fast, safe, efficient and convenient transportation at the lowest possible cost. The Federal Highway Administration (FHWA) has responsibility for carrying out the highway transportation program of DOT.[16] Large quantities of solid wastes are generated during highway construction work. The potential magnitude of this impact may be best illustrated by the fiscal year 1970 expenditures for Federal and Federal-aid interstate, and secondary highway construction of about $11.2 billion.[17] Over 50 percent was Federal funds with the balance provided by the States.[18] The FHWA has conducted research into use of processed solid waste material for highway construction.

Background

Federal aid has been provided for highway construction since 1917. However, the establishment of FHWA in 1966 marked a broadening of the Federal interest in total highway transportation. Federal and Federal-aid highway construction, highway safety, and motor carrier safety are the major program elements of FHWA. Other activities seek to coordinate modes of transportation so that an effective balance of transportation systems and facilities can be achieved.[19]

The Federal-aid highway program includes construction of the 42,500 mile National System of Interstate and Defense Highways and improvement of 872,000 miles or primary and secondary roads and their urban extensions.[20] On the former, Federal aid normally provides 90 percent or less of the total funds, and generally less than 50 percent on the latter. FHWA administers the highway beautification program and is responsible for construction of Federal highways.

The FHWA coordinates a wide-ranging research and development program involved with such topics as traffic congestion, street and highway safety, effective design, materials usage, highway costs, and social, economic, and environmental impact of highway transportation. Aspects of the research activities related to solid waste usage were studied as a part of this project.

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The FHWA develops and administers programs in cooperation with States to identify causes of motor vehicle-related accidents on streets and highways. It develops and administers safety standards relating to highway design, construction and maintenance, traffic control, and pedestrian safety. The FHWA has jurisdiction over the safety performance of commercial motor carriers engaged in interstate and/or foreign commerce, and the movement of explosives, flammables,and other dangerous cargoes over highways. The relationship of these activities to solid waste generation and recycling were judged to be nominal, and were therefore not studied further.

Organization. The overall organizational structure of FHWA provides for three levels of responsibility: Washington headquarters, regional, and divisional offices. There are nine regions; each has a regional office and several division offices. There is one division office in each State, the District of Columbia, and Puerto Rico. The headquarters office has been organized by function: Right-of-way and environment, engineering and traffic operations, research and development, motor carriers and highway safety, planning, and administration. The first three functional departments were of primary interest to this study effort.

Environmental Impact Statements

In accordance with the National Environmental Policy Act of 1969 (NEPA), the FHWA requires each state highway department to evaluate the environmental consequences of all highway construction projects, research and demonstration projects, and other major actions supported by FHWA. Those actions not having a significant impact on the environment require a declaration to that effect. Action likely to be highly controversial on environmental grounds was considered by FHWA to be significant and thus required preparation of an environmental impact statement in its NEPA guidelines.[21] Twelve effects of highway construction projects likely to be significant are set forth by FHWA. Other significant effects are referred to elsewhere in FHWA publications. Solid waste generation was not one of the effects identified.

Personnel in the FHWA's Office of Environmental Policy estimated that, of about 9,000 projects for which there is Federal involvement each year, 10 to 20 percent are of sufficient magnitude to require preparation of a detailed environmental statement. FHWA's interim guidelines for preparation of these statements specify that the contents should include the following:[22,23]

- Description of the proposed project, its purpose, and a location map.
- Discussion of the probable impact of the proposed project on the environment, both negative and positive.
- Discussion of probable adverse environmental effects that cannot be avoided. Also, alternatives to the proposed project should be described along with their probable adverse environmental effects.
- Discussion of the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

- Description of the irreversible and irretrievable commitments of resources required for the project.
- Coverage of objections raised by other Federal agencies, State and local governmental parties and private citizens including the disposition of these issues.
- Steps to be taken to minimize adverse environmental affects that cannot be avoided.

After the draft of the statement has been prepared by the state highway department, copies are distributed to the three levels of FHWA, the Council on Environmental Quality, other Federal, State, and local governmental agencies, and interested citizens. Wide circulation is given these documents. Public hearings are held to discuss the more controversial projects.

Five draft environmental impact statements were reviewed as a part of this study. The statements had been prepared for the following projects:

- Replacement of an existing bridge[24]
- Construction of 20 miles of interstate highway[25]
- Construction of 30 miles of interstate highway[26]
- Construction of 24 miles of interstate highway[27]
- Construction of the Chicago Crosstown Expressway[28]

Each statement differed in approach, items considered, and detail. It was noteworthy, however, that possible environmental effects of solid waste generation expected during demolition and clearing were not covered in any of the statements. Obviously, large quantities of solid wastes are generated during the demolition of buildings and clearing of trees from the planned roadways. These wastes will likely cause some degree of environmental impact. Solid waste generation was not considered in the statements, because it was not one of the criteria listed in FHWA's guidelines. Several FHWA officials stated that consideration is generally not given to solid waste in any environmental statements.

Included within Reference 27 was a letter from an EPA regional office with comments on the impact statement and the proposed project. The letter commented on effects of the project on water quality in a nearby lake, but not of solid wastes.

Plans and Specifications

The primary mission of the FHWA is to develop transportation policies and programs for the lowest cost consistent with the highest standards for providing safe, fast, efficient, and convenient transportation. Emphasis is placed on effective design, and consideration is given to social, economic, and environmental factors related to highway systems. A philosophy expressed by FHWA officials interviewed during the study was that, by allowing the contractor to decide the use and/or disposal of materials on the job, lower construction costs would be obtained and the mission of FHWA would be realized. Consequently, plans and specifications are often prepared to reduce construction costs without regard for total resource utilization, indirect impact on the environment, or costs to local solid waste disposal authorities.

Federal Specifications. The basic specifications used by FHWA, *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects,* (FP-69), has been patterned after the American Association of State Highway Officials (AASHO) *Guide Specifications for Highway Construction,* to establish nationwide uniformity and a consistency in specifications for highway construction.[29] The specification covers items of work, materials, and construction methods generally applicable to direct Federal highway contracts, but are adaptable for use by other highway agencies as well. They are designed to be sufficiently general to prevent early obsolescence and subsequent controversy in the administration of contracts.

On Federal highway construction projects under the direct supervision of FHWA, FP-69 is normally specifically referred to and thereby made a part of the contract documents. For each specific project, job specifications are prepared to amplify, clarify, and modify FP-69 to comply with job conditions. On Federal highway construction not under the jurisdiction of FHWA, FP-69 may or may not be included by reference in each construction contract. If not included by reference, FP-69 may be the basis for that agency's specification. More importantly, the indirect impact of FP-69 provisions can be substantial since they and the AASHO Guide Specification provide guidelines and formats for use by many highway agencies in preparing standard specifications and job specifications.

On the other hand, the direct impact of the Federal specifications, and possible alterations thereof, on solid waste generation and recycling may not be great. Table 3 indicates that only $258 million was expended in fiscal year 1970 for construction of Federal highways, compared with a total of $11.2 billion expended during the period for all interstate primary and secondary highway construction.[30] Of these Federal highway construction funds, only 25 percent were under FHWA jurisdiction. However, the Federal specifications can have an effect on the $10.9 billion expended by States (including the Federal share) and on additional expenditures for other highway construction financed solely by States, local government agencies, private developers, and foreign governments.

Because of the potential impact of FP-69 provisions, and revisions thereto, on solid waste generation and reuse on highway construction, the Federal specifications were studied in detail. Also studied were specific job specifications and contract documents for several Federal highway projects. Following are descriptions of provisions within FP-69 and from an example Proposal and Contract (the Washington Forest Highway Project in Oregon[31]) that relate to solid waste generation, disposal, and potential reuse. The numbers following each subject refer to the section number in FP-69.

Clearing and Grubbing (201). This work consists of removing and disposing of all vegetation and debris within the projected roadway path except those objects designated in the plans to remain.[32] The quantity of waste material removed depends upon the terrain and the existing vegetative growth. Data indicating the total quantities of materials cleared

TABLE 3

ESTIMATED FISCAL YEAR 1970 CAPITAL EXPENDITURES FOR HIGHWAY CONSTRUCTION[17]

(Dollar amounts in millions)

Highway system	Right-of-way acquisition	Engineering	Construction	Total
Interstate				
Rural				
Federal aid	181	214	1,642	2,037
Non-Federal aid	—	2	35	37
Urban				
Federal aid	295	164	1,250	1,709
Non-Federal aid	10	10	145	165
Total Federal aid	476	378	2,892	3,746
Total interstate	486	390	3,072	3,948
Primary				
Rural				
Federal aid	103	106	704	913
Non-Federal aid	177	196	1,579	1,952
Urban				
Federal aid	112	54	409	575
Non-Federal aid	185	96	1,203	1,484
Total Federal aid	215	160	1,113	1,488
Total primary	577	452	3,895	4,924
Secondary				
Rural				
Federal aid	50	62	475	587
100% Federal		10	248	258
Non-Federal aid	83	77	869	1,029
Urban				
Federal aid	—	—	—	—
Non-Federal aid	38	33	377	448
Total Federal aid	50	72	723	845
Total secondary	171	182	1,969	2,322
Total Federal aid	741	610	4,728	6,079
Grand Total	1,234	1,024	8,936	11,194

and grubbed per year was not available from FHWA. Similarly, data indicating quantities of solid waste generated, reused, and disposed of from other highway construction tasks were not compiled.

Burning was the most commonly used method of disposing of combustible solid waste from clearing and grubbing. FP-69 requires that burning be completed in accordance with applicable local ordinances and State law. As prohibitions against open burning become more prevalent, disposal of cleared materials will become more costly and larger quantities of waste material will be generated. It may become necessary to specify the method of residual disposal.

Noncombustible and perishable materials are to be removed and disposed of at off-site locations,[33] but FP-69 did contain a specific provision that its disposal comply with local ordinance and State law. In the Special Provisions of Reference 31 it was specified that noncombustible debris and silt-laden materials were to be placed in areas where high water or heavy rain would not wash them into streams.

FP-69 provides that all timber in the right-of-way at the beginning of construction becomes the property of the contractor unless otherwise provided.[34] The contractor may either sell the timber or dispose of it as waste material. Increased utilization of the timber would probably result if a provision was added to FP-69 requiring that merchantable portions of either felled or downed timber in the highway right-of-way be sawed into standard lengths and used in the course of construction, sold, and/or stockpiled in a designated area.

On the Washington Forest Highway Project the contractor was required to salvage any merchantable standing or downed timber within the area to be cleared.[35] In conjunction with FHWA, the Forest Service has sometimes negotiated timber sales to remove salable timber from the area to be cleared prior to start of construction. Also timber sales are conducted by FHWA when the estimated costs of cruising and staking the limits of timber removal do not exceed the estimated timber market value.

Removal of Structures and Obstructions (202). This work consists of the removal of buildings, fences, structures, pavements, pipelines, and other obstructions from the area to be cleared. It may include salvage of certain materials.[36] Salvable materials may include steel and wood bridges, concrete suitable for riprap, pipe, ballast, gravel, and other surfacing materials. The materials can often be used on the job. However, addition of provisions to FP-69 to more clearly define suitable uses, necessary processing, handling, and storage could increase its utilization. Asphalt may be reused in the roadway base or buried within the embankment, and concrete may be sized and used for fill material or stockpiled for future use. If the materials cannot be used on the job, the contractor is normally required to arrange for disposal as with nonsalvable materials. The government representative (hereafter referred to as the engineer) has broad authority in directing the contractor to use or stockpile materials for future use, or to discard the material as waste. He can also specify the method of disposal.

Excavation and Embankment (203). Excavation includes removal and disposal of soil and organic materials not suitable for use as foundation material.[37] The engineer designates the soils to be excavated and directs the method for disposal.[38] The waste materials are often placed adjacent to the roadway within the right-of-way and blended into the terrain to the extent possible.

On the Washington Forest Highway Project, FP-69 was modified to allow undisturbed stumps and roots and nonperishable objects to be left in place if they did not interfere with roadway construction. This special provision reduced solid waste disposal problems and costs. Another provision in FP-69 allows the construction of a roadway over sod and other similar vegetative matter if the roadway embankment is more than 4 ft high.[39]

Whenever a compacted road surface containing granular materials such as gravel, asphalt, or concrete, lies within 3 ft of the new subgrade, this surfacing must be scarified and recompacted. Thus, the old surfacing becomes a part of the new embankment.[40]

FP-69 provisions relating to embankment construction are standard for the roadway construction industry. The use of broken concrete and other demolition debris are not specifically mentioned. The provisions can be interpreted to allow placement of such material within the embankment.[41]

Obliteration of Old Roadways (209). When roadways are no longer needed for traffic, they are removed and the terrain restored to the original contour or to produce a pleasing appearance. Structures such as bridges and buildings must be demolished and removed. When included on the plans or directed by the engineer, materials for the new roadway can be supplied from the old roadway. Similarly, materials not suitable for the new roadway may be used in restoring the terrain of the old roadway.[42] Thus, there would be little or no solid waste from the old roadway except organic material that would be disposed of in accordance with clearing and grubbing requirements.

Roadside Cleanup (210). Upon completion of roadway construction, the contractor is required to clean the area lying within the right-of-way line. Cleaning includes clearing downed timber, dead brush, logs, debris, and the burning or otherwise disposing of the material as ordered by the engineer.[43] Salvage, reuse, and disposal provisions are similar to those for clearing and grubbing.

Temporary Erosion and Water Pollution Control (213). Soil erosion and possible water pollution are controlled during the construction phase. Control procedures include placement of mulches, such as hay, straw, fiber mats, netting, wood cellulose, bark, corn cobs, wood chips, or other suitable material acceptable to the engineer.[44] Conceivably trees, slash, and brush removed from the right-of-way could be chipped for use in erosion control, utilizing materials that would otherwise require disposal. However, Section 713.05 of FP-69 could be interpreted to disallow use of such wood chips, and require that a commercial grade of wood chips be used.

On the Washington Forest Highway Project, a preconstruction conference was held, as is usual for FHWA projects. At this time, the contractor was required to submit a schedule and plan for temporary and permanent erosion control work.[45] From the standpoint of solid waste utilization and disposal, the preconstruction conferences offer an excellent opportunity for the contractor to present and discuss his plans for use of on-site materials and for disposal of solid waste materials.

Portland Cement Treated Base (308) In the traveling plant method of highway construction, aggregate for the base can be obtained by scarifying the existing roadway or from other sources. The aggregate is placed and the specified quantity of portland cement applied and mixed. Water is applied during mixing and the material is then spread and compacted.[46] This section of the specification is applicable for both upgrading an existing roadway or for constructing a new roadway. Furthermore, it provides a use for used asphaltic concrete, thus providing a secondary use for this material that would otherwise be disposed as solid waste.

Loose Riprap (619). Stone riprap is used for stream bank protection. No reference was made in the specification to use of broken concrete for riprap.[47] Discussions with FHWA personnel indicated, however, that concrete has often been used for riprap.

Mulch (713.05). Mulch may include wood chips, straw, hay, wood fiber, sawdust, peat moss, and peat humus. The specification generally precludes use of secondary materials. For example, wood chips must be obtained from disease-free green hardwood and meet specific dimensional requirements. All wood chip mulch must also be free of leaves, twigs, shavings, bark, or other materials injurious to plant growth. To comply with these requirements it would be necessary to have commercial wood chips supplied. The high production chippers currently being demonstrated produce chips larger than specified.

A second example is sawdust. It can be used, but must be at least 5 years old. This requirement generally precludes use of sawdust not sold commercially.

General Provisions. Included in the proposal and contract documents for Federal highway projects and for most Federal construction of all types are General Provisions prepared by the General Services Administration, based on the Federal Procurement Regulations (41 CFR) 1-16.401. Section 9 of the General Provisions requires that "unless otherwise specifically provided in this contract, all equipment, material, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade for the purpose intended."[48] Obviously this requirement discourages the use of secondary materials.

State Highway Departments. State highway agencies control the design, construction, and maintenance of highway systems in their respective states. Many states prepare their own standard specifications, which are normally patterned after the AASHO *Guide Specifications for Highway Construction,* but modified to comply with local conditions and practices. FHWA requirements are also considered, since a major portion of the funds used for highway construction are provided by the Federal government. Design criteria for Federal aid interstate, primary and secondary highways are also generally patterned after the AASHO guidelines.

The plans and specifications prepared by State highway departments for each project receiving Federal aid are approved by the responsible FHWA district office. It appears that FHWA does not strictly regulate State practices concerning design work or specifications. FHWA headquarters personnel believe that more economical construction results if the State personnel are allowed a relatively freehand in design and specification preparation, as long as the State generally complied with FHWA and AASHO specifications. There are certain exceptions to this generalization; e.g., environmental impact statements are required. As the approving agency, FHWA can influence the reuse of materials currently disposed as wastes by the States during highway construction. Secondary materials are now used in some construction, but not to the extent possible, even though they may be classified as standard items in some specifications.

Construction

Highway construction can be defined as a moving manufacturing plant with a stationary product while most other manufacturing consists of stationary plants to which raw material is shipped and from which finished goods are transported. A significant portion of highway construction costs are associated with transporting materials to the construction site. The haul distance may range from a few hundred feet for earth materials onsite to several miles for concrete, bituminous, and other road construction materials, and hundreds of miles for fabricated steel. Transportation costs are also incurred in removing solid waste materials from the site.

Major Solid Waste Problems. Major solid waste problems on highway construction in the order of importance are removal and disposal of unstable material, slash, and tree stumps and roots.

Unstable Material. Unstable material, such as muck or peat, must be excavated and removed from the job site. The material may be excavated, stockpiled and placed on the sides of the embankment, outside the structural prism. Where this practice is not possible, the material must be hauled away and disposed of off-site.

Slash and Timber. In most rural areas, slash and unmarketed timber (vegetative material) are burned for disposal. This practice is unlawful in many urban areas, and there is an increasing tendency to prohibit burning in rural areas as well. FHWA personnel indicate that all open burning in rural areas may cease within 5 years. When this occurs, more cleared timber will probably be marketed and disposal of slash will become an even greater solid waste problem. Under such conditions, utilization of unmarketable timber and slash would be more attractive.

In some locales, disposal methods other than open burning are practiced. Pit burning is one such method. It provides more complete incineration, and air pollution is reduced, compared with open burning. However, the cost for this method is much higher than for open burning because a pit must be constructed, debris must be pushed into the pit, and supervision is needed.

Where restrictions prohibiting burning exist, slash and timber have been buried adjacent to fill slopes within the road right-of-way. In effect, this is a landfill operation. The Federal specifications allow the contractor to dispose of waste materials on adjoining property with written permission of the property owner. Large chippers that can process logs up to 12 in. and 24 in. in diameter are being developed and demonstrated with considerable success. Chips from these machines help provide slope stability, since they are largely unaffected by winds and storm runoff. Problems associated with use of wood chips on the highway construction site include pest harborage, fire hazards, and acid runoff.

Tree Stumps and Roots. This problem is similar to that described for slash. In many cases the tree stumps can be cut off at the ground surface. Left in place, some additional slope stability can be achieved by the roots and the waste disposal problem can be reduced.

Demolition Debris and Clearing and Grubbing. FHWA personnel indicated that a major problem in incorporating solid waste materials in highway construction was the lack of quantity. Highway construction often requires embankments requiring large volumes of fill. The relatively small quantities of inert demolition debris suitable for use in embankments were not considered significant. From strictly a highway construction standpoint, the cost to haul demolition debris for an embankment may exceed the cost to use locally available or imported earth. In many urban areas the cost to place demolition debris into highway embankments would be less than to dispose of the material via landfill.

The District of Columbia Redevelopment Land Agency has discussed with FHWA the possibility of using demolition debris from urban renewal projects for highway construction. FHWA indicated that such a plan would be acceptable on an experimental basis. This plan could substantially reduce the cost of demolition debris disposal from the renewal project. It could even reduce highway construction costs if the debris reduced the quantity of material imported for embankments. The District of Columbia also discussed with DOT the feasibility of reclaiming aggregate from asphaltic concrete. The concept has excellent potential, especially in locations where there is a shortage of good aggregate for use in asphaltic concrete construction. Neither project was initiated, however, for indeterminable reasons.

DOT and HUD are required by law to consult and exchange information regarding their respective transportation policies and activities and to carry on joint planning, research, and other activities. Authority for cooperating in mutually beneficial activities such as debris disposal now exists.[49]

Demolition debris from urban renewal projects sponsored by HUD was estimated to be more than 3 million tons annually (See Chapter IX). Assuming one-quarter of the debris can be economically reclaimed, and one-half requires landfill and/or incinerator disposal because it is organic material or is a mix of organic and inert material, nearly 1 million tons of solid waste would be available for disposal within highway construction projects. This estimated quantity is about equivalent to the annual solid waste generation of a city of 1 million, or about 0.5 percent of the Nation's municipal solid waste generation.

The quantity of demolition debris from clearing of structures from urban highways was not documented. However, based on Table 4, expenditures for interstate, primary, and secondary highway right-of-way acquisition and construction, the quantity is significant. Although the extent of current demolition debris utilization was not documented, it is anticipated that a larger percentage could be used in roadway construction if advanced plans were formulated for its utilization and disposal, especially if this planning function were done on a regional basis rather than a job-by-job basis.

TABLE 4

CAPITAL EXPENDITURES FOR HIGHWAY CONSTRUCTION*

(Dollar amounts in millions)

Fiscal year	Rural highways	Urban highways	Total
1968	6,347	3,991	10,388
1969	6,197	4,118	10,315
1970	6,813	4,381	11,194
1971	7,380	4,831	12,211

* From U.S. Department of Transportation, Federal Highway Administration. Unpublished data, April 12, 1972.

Research and Development

The FHWA has been interested in results of research into reuse possibilities of industrial and domestic waste materials, particularly those relating to highways. Following is a summary of several secondary materials that show promise for use in highway construction.[50]

Fly Ash. Fly ash is a finely divided mineral product produced by the burning of pulverized coal. It is high in silicate, aluminum, and iron. Fly ash is classified as a pozzolan since it has the property of combining with lime in the presence of moisture to form a cementing material. For this reason, it is useful in construction.

A considerable amount of research has been performed on fly ash. *Specifications for Fly Ash and Raw or Calcined Natural Pozzolans for Use in Portland Cement Concrete*, ASTM C 618, describes the quality of fly ash added to concrete mixes. Alternatively, fly ash can be added to cements as described in *Specifications for Blended Hydraulic Cements*, ASTM C 595.

Fly ash has been used as a partial replacement for cement in concrete dams. This application was justified on the basis of cost savings, reduced heat liberation, and control of adverse chemical reactions with certain aggregates. With as much as 35 percent of the cement replaced by fly ash, the ultimate strength of the concrete will generally be greater than that of concrete without fly ash. However, concrete made with fly ash is slow to cure and does not attain early strength needed for some applications. Many highway engineers are reluctant to compound the problem of controlling the quality of concrete on the job by adding fly ash as an additional ingredient, since fly ash can vary in quality from lot to lot.

Fly ash has been used for stabilization of roadway bases. A strength increase and better resistance to freeze-thaw and wet-dry cycling results. Fly ash use on state highway work has been limited because of its increased cost over that for standard base course construction.

Fly ash is also acceptable for use as the finely divided material in asphaltic paving mixtures as evidenced by *Specifications for Mineral Filter for Bituminous Paving Mixtures*, ASTM D 242. Its use for this purpose has occurred in areas located near metropolitan centers where fly ash was produced.

Blast Furnace Slag. Blast furnace slag is the nonmetallic product developed simultaneously with iron in a blast furnace. It has been used extensively in highway construction and is acceptable as aggregate for concrete under *Specifications for Concrete Aggregate*, ASTM C 33, and for bituminous mixtures under *Specifications for Coarse Aggregate for Bituminous Paving Mixtures*, ASTM D 692.

All available supplies of blast furnace slag are generally consumed in a useful manner. Other types of slag, such as those from the open hearth process or from the production of nonferrous metals, have not been as acceptable because of chemical instability.

Glass. Crushed glass has been used as aggregate in bituminous paving mixtures on an experimental scale. Test strips have been placed at five locations in the United States and at two locations in Canada. Experience on the test installations indicates that it is possible to use glass as a replacement for major portions of the aggregate in bituminous mixtures and still obtain satisfactory levels of stability, density, and resistance to water. Further evaluation is needed to determine such factors as long-term durability, resistance to severe traffic conditions, skid resistance, and effects on tire wear.

Rubber. Waste rubber has been used in conjunction with asphalt for several highway applications. Attempts have been made to improve the performance of asphalt paving by the addition of rubber, the ultimate objective being to enhance the elasticity of asphaltic concrete over a wide range of temperatures. The rubber is introduced into the asphalt or the asphaltic concrete mixture in the form of small particles and is then mixed with the application of heat.

In one application, rubber tires were devulcanized in order for the rubber to regain plasticity, and added in powdered form to asphaltic mixtures. About 200 miles of this type of pavement are reportedly in existence.

Rubberized asphalt has been considered for use as a strain-relieving inner layer to prevent reflection cracking in asphaltic concrete surfaces. An experimental project of this type was installed by the city of College Station, Texas. A mixture of rubber aggregate, soil or sand, and asphalt was placed in a layer of ½ in. thickness or less between the roadway base surface and foundation course.

Another application of rubberized asphalt is for joint sealant. The joint sealant must be flexible to accommodate movements of adjoining pavement slabs and still adhere to slab materials. Federal specifications for rubberized asphalt joint sealants reportedly exist.

One tire-manufacturing company has been conducting tests of discarded tires for use as safety barriers.[51]

Coal Refuse. A laboratory study of the properties of carbonated bonded coal refuse found potential for utilization of the material in road building.[52] Using up to 12 percent lime hydrate and 9 to 15 percent water, high compressive strengths were obtained. The study recommended additional work to demonstrate the carbonate bonding process on a larger scale prior to use for road construction.

Wood Chips from Mulching. As discussed previously, trees and other slash cleared from highway right of ways can be processed into chips and applied as mulch during seeding operations. Wood debris from demolition can be used in a like manner.

Wood and Paper for Seeding Operations. A current practice for seeding highway right-of-way areas consists of applying a mixture of wood fibers, seed, fertilizer, and water by spraying. Although longer wood fibers are superior for this purpose than the shorter paper fibers, waste paper could be used, particularly on level areas.

Mine Tailings. Tailings resulting from mining operations can be used either as fill material or as a base coarse for highways. In some cases the material first must be stabilized.

Metal Cans. Metal cans, particularly 55 gal. drums, can act as energy absorbers and therefore are useful for impact attenuation near highway structures. Painted drums are commonly used in some areas as temporary directional barriers on highway reconstruction projects.

Sulfuric Acid Wastes. FHWA officials consider lime-treated sulfuric acid wastes as a potential source of binder or aggregate material in highway construction work. When treated with lime, sulfuric acid forms calcium sulfate. Further treatment with fly ash produces a strong, stable compound.

Recommendations

- *Environmental impact statements should include estimates of the quantities of solid wastes generated as a result of highway construction activities, indications of the intended disposal or reutilization methods, and an evaluation of potential environmental effects.*

  By identifying the materials to be generated from the highway construction project, it is more likely that a use will be found for these materials. It appears that data needed to estimate the quantity of solid waste to be generated is available. Additional effort will be needed to assess possibilities for reuse and to estimate possible environmental effects of alternative uses or disposal methods.

- The Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, *FP-69, should be modified to encourage material reuse and to require acceptable methods of solid waste disposal. Effort should be extended by FHWA to encourage AASHO to similarly modify its* Guide Specifications for Highway Construction.

- *Section 9a of Standard Form 23-A should be revised to allow use of secondary materials suitable for the purpose intended.*

  Currently, this general provision, included in most civil construction contracts of the Federal government, specifies the use of only new materials.

- *Specifications and general provisions of the State highway departments should be reviewed to identify and eliminate provisions restricting materials used in highway construction to new materials. Additionally, effort should be extended by the FHWA to encourage State highway departments to modify their standard and/or job specifications as discussed above for FP-69.*

- *The FHWA should attempt, through coordination with HUD and State highway departments to utilize inert demolition wastes as embankment material for urban highways.*

  Significant coordination efforts would be required to implement this policy, but it can serve two purposes: Reduce the cost for disposal of inert demolition wastes from urban renewal or other sources and minimize the environmental impact of disposal of large quantities of wastes.

- *Within plans or special provisions on Federal highway construction contracts, the following information should be included:*

  – *An estimate of the quantity of solid waste material expected from clearing and grubbing operations and removal of structures. (In most cases these estimates are already at least partially made). By identifying the types and quantities of materials to be removed, the contractor will be more likely to utilize these materials in his construction.*

  – *Potential disposal sites for unusable material, and, where practical or necessary, disposal methods. (If the contractor can use solid wastes generated through highway construction activity, he should be allowed to deviate from the approved disposal plan, with the approval of the engineer).*

- *Additional funds should be allocated for research and demonstration of the use of secondary materials for highway construction.*

  Emphasis should be on demonstrating materials that appear to be adaptable for early full-scale use by State highway departments. Several full-scale demonstrations are needed for each material application along with an effective evaluation of the materials for nationwide or regional applications. State highway departments should be encouraged to incorporate into their specifications provisions calling for the utilization of proven secondary materials. Research on promising materials and methods is needed, but, owing to the time required for research, demonstration, dissemination of results, and adoption by State highway departments, 5 years or more is probably required for new material application to have a significant effect on the solid waste problem.

CHAPTER IV

FEDERAL TRADE COMMISSION

Abstract

The Federal Trade Commission (FTC) administers various laws that prohibit the use of unfair methods of competition in commerce and unfair or deceptive acts or practices in the market place. Most constituents of solid waste begin as a consumer product and are discarded after use. Possibilities exist whereby the generation of solid wastes can be reduced through control of consumer product constituents. Because FTC has existing authority in areas related to consumer goods, this agency has the potential to indirectly influence solid waste generation. Other possible FTC influences on solid waste recovery are also discussed.

Background

The FTC was organized in 1915 pursuant to the Federal Trade Commission Act of 1914, to replace the Bureau of Corporations. It was given powers to investigate the conduct, practices, and management of any enterprise engaged in commerce in the United States. Also, certain responsibilities regarding antitrust suits were delegated to FTC under the original Act.

During the 57 years of its existence, additional responsibilities have been assigned to FTC through further legislative action. These are listed below, along with a brief description of each.

- Clayton Act—prohibits discrimination in price, exclusive dealings and tying arrangements, and corporate mergers when such practices or arrangements may substantially lessen competition or tend toward monopoly; interlocking directorates under certain circumstances; the payment or receipt of illegal brokerage; and discrimination among competing customers in furnishing of or payment for advertising or promotional services or facilities.

- Robinson-Patman Act—prohibits discriminatory pricing and other discriminatory practices in the sale or distribution of goods.

- Export Trade Act—requires FTC to supervise the registration and operation of association of American exporters engaged solely in export trade.

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- McCarren-Ferguson Act—extends the applicability of antitrust legislation to insurance companies.

- Wool Products Labeling Act—prohibits misbranding of wool products.

- Fur Products Labeling Act—prohibits misbranding of fur products.

- Flammable Fabrics Act—prohibits the interstate marketing of dangerously flammable articles of wearing apparel and interior furnishing and of dangerously flammable fabrics and related material intended for use or which may be reasonably expected to be used in any such product.

- Textile-Fiber Products Indentification Act—prohibits the misbranding and false advertising of textile products (except wool) and defines required labeling information for textile products.

- Fair Packaging and Labeling Act—prohibits unfair and deceptive packaging and labeling and specifies conditions to be met by packagers of consumer goods.

- Federal Cigarette Labeling and Advertising Act—requires inscription of a health warning on cigarette packages.

- Consumer Credit Protection Act—requires credit cost disclosure by consumer creditors (retailers, finance companies, nonfederal credit unions and other creditors not specifically regulated by another government agency) to assure a meaningful basis for informed credit decisions.

To administer its responsibilities, the FTC has recently reorganized into two major operating bureaus. These are the Bureau of Competition and the Bureau of Consumer Protection. The Bureau of Competition has primary responsibility for enforcement of the first four statutes listed above dealing with monopolistic behavior. The Bureau of Consumer Protection enforces these laws related to mislabeling, deceptive packaging and advertising, and product safety.

In fiscal year 1970 the FTC budget was $20.7 million; approximately 40 percent or $8.4 million was expended on efforts to maintain free competition. Consumer protection activities of the FTC were allocated 50 percent or $10.3 million. The remainder was expended for management and planning efforts.[53]

In recent years FTC's activities related to consumer protection have increased more rapidly than its antimonopoly and other corporation-related activities. For example, consumer protection activities have risen from 44 percent of the budget in 1968 to 50 percent in 1970.[54,55] This increase reflects rising public interest in this area.

The influences of both FTC bureaus on solid waste generation and recycling are discussed under two main categories: Trade practices, and labeling and packaging requirements.

Trade Practices

Antitrust Activities. The FTC can influence solid waste recycling activities through implication of corporations involved in processing and recycling secondary materials in antitrust violations. For example, an industrial organization may be required by FTC to divest itself of a secondary material processing subsidiary under antitrust action. Or, a group of secondary material processors may be required to void a mutually beneficial operating agreement because of trade restraint. No specific cases of these types have been noted, but the possibility of their occurrence exists. On the other hand, enforcement of antitrust laws by the FTC can be a valuable tool in assuring that free, fair, and vigorous competition prevails in the area of solid waste recycling.

Industry Guidance. In addition to antitrust activities, the FTC strives to protect the consumer and businessman in other respects. Trade practices are monitored and regulations devised and promulgated when it appears that certain practices are unfair. For example, the FTC has devised a *Trade Regulation Rule for Games of Chance in the Food and Gasoline Industries*, and another on *Unsolicited Mailing of Credit Cards.* Through this mechanism, FTC interprets the original Federal Trade Commission Act to apply to contemporary business practices that appear unfair or deceptive.

Decisions made under this industry guidance program can have direct and indirect effects on solid waste generation and recycling. For example, the FTC has declared it to be an unfair trade practice to ship scrap iron and steel in rail cars so that inferior quality products will not be readily discovered upon surface inspection.[56] Similarly, the willful delivery of an inferior product by a paperstock dealer or broker under a contract for a particular grade of wastepaper has also been declared an unfair trade practice.[57] These regulations have the effect of improving product reliability of two major secondary material industries. There is no estimate available to indicate the potential increase or decrease in quantity of waste materials reclaimed as a result of these regulations.

Other FTC actions may have made it more difficult to market products made from reclaimed materials and thus these actions discourage solid waste recovery. For example, a manufacturer requested a ruling by FTC on whether it would be necessary to label an electrical fuse as "rebuilt" or "remanufactured" if each used fuse were disassembled and all used parts inspected to insure they met new part standards. The Commission advised the company that the product must be labeled, "rebuilt fuses." In doing so the FTC cited its holding that, in the absence of disclosure to the contrary, merchandise having the appearance of merchandise composed of new materials but which is partially or wholly composed of reclaimed materials, will be regarded by purchasers as being entirely new. FTC officials express the position that the consumer has the right to know the types of products being purchased. The Commission further contends that a substantial segment of the consuming public has a preference for merchandise that is composed of new and unused materials. "This has been held to be so without regard to the comparative quality of the new and rebuilt products, for in such matters the public is entitled to get what it chooses no matter what dictates the choice."[58]

This ruling implies that merchandise made wholly or in part from used materials will generally not be considered a substitute for merchandise made from new materials. This and similar FTC rulings limit the market for products made from secondary materials. In the absence of quantitative information, however, it is difficult to estimate the impact of such actions on solid waste generation or the degree to which they hinder recycling.

Product Labeling and Packaging Requirements

Textiles. FTC enforces labeling requirements for textile fabrics. It has been alleged, mainly by those in the secondary wool materials industry, that FTC's textile labeling requirements hinder efforts to reclaim textile materials from solid wastes.

The FTC has stipulated that the terms "virgin" or "new", when used to describe a textile fiber product, shall not be used unless the product is composed wholly of new or virgin fibers. These fibers cannot have been reclaimed from any spun, woven, knitted, felted, bonded or similarly manufactured product.[59]

A product must be labeled as containing "reprocessed wool" if all or part of the constituent wool has been reclaimed from material not previously used by a consumer. If wool reclaimed from garments previously used by consumers has been utilized in a product, the product must be labeled as containing "reused wool." At the present time, wool is the only fabric material that must be so labeled. In the late fifties, when Congress was preparing the Textile Fiber Products Indentification Act, the imposition of similar labeling requirements on synthetic fiber materials was considered. However, this idea was rejected. FTC textile experts indicate that wool is the only fiber material that is reused today in any significant quantities.

The imposition of a labeling requirement to enable the consumer to differentiate between previously used and new wool fiber products has been based on performance. Reprocessed or reused wool is of inferior quality to virgin wool. Various test methods and microscopic examinations have been devised to identify this quality difference.[60]

The market for reprocessed and reused wool has been limited in the apparel industry as a result, and only low-cost, low-value wearing apparel is made from reclaimed wool.

A survey conducted by the General Accounting Office to determine the end use of over 1.2 million lb of carpet wool wastes developed the following information:[61]

Description	Weight (lbs)
Mops	465,289
Baseballs	402,396
Floor pads	155,611
Clothing	75,000
Gaskets	64,267
Other	59,698
Total	1,222,261

It can be seen that the greatest quantities of reused wool wastes are used in the manufacture of nonapparel items.

Unfortunately, there are no data presently available indicating the total quantity of wool reclaimed for use. Nor is there reliable information indicating the total amount of wool waste generated in the United States. However, it was the opinion of three textile manufacturing experts, representing the FTC, the Department of Commerce's Office of Textiles, and the Textile Fibers and By-Products Association, that most wool wastes readily recoverable and occurring in significant quantities are now reclaimed. Furthermore, these experts expressed the belief that rescinding the wool labeling requirement would have no significant impact on the quantity of wool reclaimed.

It appears that the complaints against FTC's labeling requirements by those persons engaged in reclaiming wool wastes are primarily based on economics. If labeling requirements were rescinded, reclaimed wool would find increased use in apparel manufacturing. An increase in value for reclaimed wool would be expected. However, the total quantity of wool wastes recovered for reuse would not increase significantly. Therefore, FTC-enforced labeling requirements for wool products do not appear to significantly hinder wool waste reclamation nor encourage its generation.

FTC's activities under the Flammable Fabrics Act have an undetermined effect on solid waste generation. FTC determines through testing whether garments exceed the safe limits for flammability. Products conforming to FTC's flammability standards are so labeled. If standards are not met, the FTC issues cease and desist orders to restrain the sale of these items. In each case the Commission records its actions in individual reports, but the quantity of material involved is not compiled. Therefore, the total weight of material the FTC orders recalled by distributors or manufacturers in any given year can not be readily determined.

Although the procedure varies, the distributor or manufacturer recalling condemned flammable apparel either reprocesses the goods to conform to standards (if economically feasible) or disposes of the lot as waste. If the merchandise is imported, the distributor may elect to ship the condemned goods back to the manufacturer. As long as the merchandise is out of the channels of domestic commerce, the FTC does not monitor the destination of the condemned goods. Ultimate disposition of such goods is not recorded. According to FTC representatives, even a rough estimate of total solid waste generation resulting from FTC action cannot be readily ascertained.

Other Commodities. Under the Fair Packaging and Labeling Act of 1966 (FPLA), the FTC has inititated research and studies into such topics as "economy size" representation, coupon practices, slack-fill practices, ingredients listing, and characterization of package sizes. (The term "slack-fill" refers to the practice of filling a package to less than its capacity. A package is nonfunctionally slack-filled if it is so filled for reasons other than (1) protection of the contents, or (2) to satisfy the requirements of the machines used in enclosing the contents.) The FTC shares responsibility for implementation and administration of the FPLA with the National Bureau of Standards (NBS) and the Department of Health, Education and Welfare (DHEW). The DHEW has responsibility for consumer commodities defined under the Federal Food, Drug and Cosmetic Act, while the FTC regulates all other consumer commodity packaging and labeling.

Because packaging materials make up a significant portion of solid wastes (reported to be approximately 13 percent of the estimated 350 million tons of residential, commercial and industrial solid wastes generated per year),[62] certain regulations could conceivably reduce the quantity or the type of solid waste generated. Restrictions on package size and package material constituency could reduce solid wastes, and may possibly encourage recovery of packaging materials for reuse. For example, if cereal boxes were required to be of cubical configuration instead of the present oblong parallelepiped, the resultant weight and compacted volume of solid waste from this source would be reduced by approximately 11 percent. (Assume the average cereal box of 10 ounces has dimension of 10.375 x 7.5 x 2.375 in. and a volume of 185 cu in. A cubical cereal box of the same volume would have an edge of 5.70 in. The weight and compacted volume of the empty cereal box as waste has been assumed to be proportional to its surface area.)

Similarly, if the FTC were to influence package material constituency, use of readily recycleable materials could be encouraged.

However, strict adherence by the FTC to the dictates of the FPLA will only indirectly affect solid waste generation or recovery, and that influence will be slight.

The FPLA was passed so that "packages and their labels (would) enable consumers to obtain accurate information as to the quantity of the contents and (would) facilitate value comparisons.[63] Various labeling and packaging requiements are set forth in the Act for the specific purpose of preventing consumer deception. Also, the FTC has been empowered to promulgate additional regulations to prevent consumer deception or to facilitate value comparisons between commodities. Two actions FTC may take in this regard are

- "Establish and define standards for characterization of the size of a package . . . which may be used to supplement the label statement of net quantity of contents of packages containing such comodity . . . " This statement continues with " . . . this paragraph shall not be construed as authorizing any limitation on the size, shape, weight, dimensions, or number of packages which may be used to enclose any commodity.[64]

- "Prevent the nonfunctional slack-fill of packages containing consumer commodities.[65]

Thus under present law, FTC cannot influence the design or constituency of consumer commodity packages. It is possible that strict enforcement of the "slack-fill' requirements, currently under study by the FTC, will result in a reduction in solid waste generation. Those packages that are slack-filled are, by definition, larger than necessary to contain the packaged commodity. One reason for this practice has been to present a shelf image of a larger container. Curtailment of this practice may result in some reduction in packaging waste. On the other hand, a packager found in violation of a slack-fill regulation may change package design entirely and end up using more material or less readily disposable material in the new containers. It was difficult, therefore, to assess the extent to which the FTC would influence packaging waste generation through enforcement of this portion of the FPLA.

Environmental Impact Statements

Public Law 91-190, The National Environmental Policy Act of 1969, requires environmental impact statements to be prepared for major Federal actions that would significantly affect the quality of the human environment. However, FTC has not prepared any statements nor was the preparation of such statements planned as of this writing. FTC officials expressed the view that environmental impact statements should not be required for their agency. They reasoned that FTC's sole goal is to protect the consumer from unfair trade practices. Possible environmental side-effects should have no bearing on a decision aimed at protecting free trade.

Although this attitude apparently exists within the FTC, there are indications that the agency will consider environmental matters more fully in the future. Other FTC officials point out that, through cooperation with EPA and the Council on Environmental Quality (CEQ), procedures for handling environmental impact statements, as required by P.L. 91-190, have been developed and were published in late 1971. Also, although no formal liaison exists, FTC periodically meets informally with high level EPA personnel to discuss common problems.

Recommendations

- *The FTC should consider product performance as an additional criteria for the public to use in judging the suitability of a given product.*

  Following the expressed position that the public is entitled to know what it is buying and to purchase what it chooses, FTC has required full disclosure of product contents, including source of materials, either new or used. This position results in a marketing advantage for new materials. Instead of supporting the concept that used goods or goods composed of used materials are inferior, the Government should take the lead in establishing a product performance certification system.

  Under such a system, if Product A composed of used materials has performance characteristics inferior to Product B, composed of new materials, then Product A's marketability would be effected as now is the case. However, if Products A and B can be demonstrated to perform equally well for the intended use, the marketability of Product A would no longer be hampered by FTC labeling requirements. The producer of Product A would likely increase his use of secondary materials in his manufacturing process. Thus, one effect of the performance certification system would be an increase in the quantity of materials reclaimed for reuse and recycling.

  An inherent problem in use of product performance certification is the time and effort required for certification and enforcement. The logical agency within the Federal Government to organize a certification system would be the National

Bureau of Standards. This agency is discussed further in Chapter VIII. Alternatively, a nationally recognized testing agency, such as the American Society for Testing Materials, could develop the procedures required for product performance testing and certification. The product performance tests could be conducted by the manufacturers.

FTC officials agree that establishment of a system of product performance standards would be beneficial and are contemplating action in this direction.

- *It has been recommended in Chapter VIII that the National Bureau of Standards (NBS) seek voluntary packaging design changes by manufacturers to effect a reduction in solid waste generation and/or to facilitate waste recovery. FTC and NBS should work cooperatively in attempting to achieve voluntary package design limitation.*

  If such an effort proves futile, FTC should seek to alter the Fair Packaging and Labeling Act so that packaging design and constituency can be regulated by Federal agencies.

- *FTC should prepare environmental impact statements as directed by Public Law 91-190, and consider the possible ramifications of its actions upon solid waste generation and recycling, among other factors.*

  Regardless of whether FTC's decisions are influenced by potential environmental side effects or not, the public should be fully informed of the expected consequences.

CHAPTER V

FOREST SERVICE
DEPARTMENT OF AGRICULTURE

Abstract

The Forest Service influences use of the country's forested lands. During the harvesting of timber, solid wastes in the form of branches, tops, and low-grade trees are generated to varying degrees. These wastes constitute a disposal problem.

Wood and wood products, particularly paper, are a major constituent of many manufactured products. These products also eventually become solid waste disposal problems. The agency has been active in developing and promoting the efficient utilization of wood resources and has cooperated with other agencies in studying resource recovery aspects of solid waste management. These and other Forest Service activities are described in the assessment of this agency's influences on solid waste generation and recycling.

Background

The Forest Service has major responsibility within the Federal Government for promoting the conservation and efficient use of the Nation's forested lands. Although it directly controls only about 19 percent of the commercial forest land in the United States, the Forest Service influences all forest resource owners.[66]

Administrative responsibility for the Nation's forest reserves was transferred to the Department of Agriculture's newly formed Forest Service in 1905. Today the Forest Service has three major functions, as described below:

- Forest Research. Basic and applied research is carried out on problems associated with all aspects of forest land management and uses of forest resources. Often executed in cooperation with State colleges and other educational institutions, the research projects include, but are not limited to, studies on tree genetics; wildfire prevention, detection and supression; improved forest product processing techniques; and nutrition.
- The National Forest System. Forest Service personnel assigned to this activity are directly responsible for the management and development of the national forests.

Techniques of forestry are applied to the growing and harvesting of timber for manufacture of over 5,000 wood and paper products.[67] The national forests are also managed to conserve water resources, and to provide for domestic and wild animal forage, and public recreation.

The 154 national forests and 19 national grasslands are administered on a regional basis. Responsibility is passed to the Forest Supervisors, who manage each national forest.

A major duty of the Forest Service administered under the National Forest System involves timber management in national forest lands. Trees are sold to contractors on a planned basis following set policies and regulations.

- State and Private Forestry. The Forest Service assists local public and private owners of forests and private industry by providing assistance and current technical information on topics such as harvesting, processing, marketing, disease control, fire prevention and flood control. Knowledge of improved forestry techniques developed through other Forest Service activities is thus made available for use on private and State-owned forest lands.

The Forest Service budget for fiscal year 1971 was $652 million.[68] Research activities were budgeted at $48 million, according to Forest Service officials, with the remainder being applied to the National Forest System, cooperation with state and private forest owners, and administration activities.

Each of the above-described Forest Service activities influence the amount of solid wastes generated and/or recovered. Policies, regulations, and procedures affecting resource utilization and solid waste are discussed in the following sections in relation to four distinct phases that occur in processing trees for ultimate use: harvesting, manufacturing, pulping, and use.

Harvesting

Millions of tons of solid forestry waste are generated naturally and as a result of logging operations. Branches, tops, stumps, defective, and small trees are either left in the forest after harvesting or the slash (as such residue is called) is burned in place to leave ash. Burning has been the most economical method of volume reduction and disposal. It was estimated that the volume of unsalvaged dead trees amounts to 5.6 billion cu ft per year or roughly 36 percent of the net growth of sawtimber on all commercial forest lands.[69] Much of this was in the form of limbs and dead trees resulting from natural causes such as fires, disease, and aging. On balance, Forest Service activities are oriented towards maximizing forest resource utilization and reducing solid waste generation.

Solid Waste Volume Reduction and Recovery. Regulations promulgated by the Forest Service specify harvesting techniques to be followed by contractors who purchase timber from national forests. These techniques are designed to minimize damage to the forest environment and maximize the wood resource utilization. Requirements are set for logging road construction, slash disposal, and tree-cutting methods, among others. Specifically, the requirement stipulating the minimum dimensions to which a cut tree must conform affects a greater utilization of the tree. Presently, the minimum small-end diameter allowable for a cut tree varies from 2 in. to 10 in., depending upon geographic, economic, and timber conditions. A contractor who cuts the tops to a greater diameter to facilitate handling is subject to a damage payment. Thus, this requirement results in a lower volume of treetop wood cut and left as slash. Furthermore, as handling and processing technology improves, the Forest Service revises its standards. For example, in one region, the minimum small-end diameter has recently been decreased to 4 in. from 8 in. for certain types of trees.

In another effort to improve forest resource utilization and reduce residues, the Forest Service encourages recovery of dead and down timber and cull trees. For instance, in 1962, approximately 393 million cu ft of timber in the Pacific Coast section (Alaska, California, Hawaii, Oregon, and Washington), or 11 percent of total roundwood production, came from dead and cull trees.[70] (These trees are natural occurring and do not result from man's harvesting activities). Only a portion of the potential salvage is represented by this figure. There was a backlog of approximately 10 billion cu ft of salvable timber in the Pacific Coast section alone, and this increases by about 1.4-billion cu ft each year. Increased utilization and resultant reduced quantitities of wastes in the forests are distinct possibilities. Methods for recovery of these resources are under investigation by the Forest Service.

Various research activities are ongoing in which techniques for more efficient harvesting are being studied. For example, the Forest Service was investigating a method by which a tree is scissored off at ground level, thus reducing stump size and including a greater portion of the tree in the harvested log. Until this practice becomes widespread, the Forest Service now levies a penalty charge of $1.00 against contractors for each stump exceeding a specified height.

It has been estimated that as much as 20 percent of the wood content of a tree can be in the stump and root system. This resource at present goes largely unharvested. The Forest Service has given preliminary consideration to possible methods for harvesting this wood, but no research projects are now contemplated. However, the value of the wood in the root system may be greater in place than it would be following conversion to products, since roots are known to be beneficial in controlling soil erosion in harvested forest areas.

Another research activity was underway to develop solutions for economical disposal and/or reuse of slash. Slash is currently left in place to decay or else disposed of by windrowing and burning. On a trial basis, the Forest Service was experimenting with the technique of yarding the slash in a central location for controlled burning.

Newly developed harvesting techniques that result in less slash generation have been disseminated throughout the country for use by State and private forestry personnel through the Forest Service's cooperative programs.

The principal problems preventing the forestry industry from extensive use of harvesting residuals are related to collection and debarking. Slash contains usable wood fiber, but in a loose state it cannot be economically transported to a central processing plant for recovery of valuable constituents. Forest Service researchers are investigating the practicability of using portable chippers to reduce the volume of slash so that the harvesting residue can be removed for use. Such a solution may be practical only if an effective method of debarking chipped limbs, tops, and branches can be devised. Most uses for wood chips, such as in particle board, wood pulp, and cattle feed, are possible only if the chips are essentially free from bark contamination. In this regard, the Forest Service has encouraged research into bark separation techniques. Various processes are now under study by the Forest Service, by industry, and at the university level to develop a workable bark separation and subsequent segregation system. The best opportunities for chipped slash utilization appear to be in pulp manufacture. Consequently, research efforts are being concentrated in that area.

Solid Waste Generation. The efforts of the Forest Service towards encouraging maximum forest resource recovery are not entirely successful, due to two main reasons: (1) The Forest Service directly controls harvesting practices in only a part of the Nation's commercial forests, and (2) Forest Service regulations are difficult to effectively enforce and can be circumvented, oftentimes resulting in wasteful practices.

Of the 511 million acres of commercial forest land in the United States, only 97 million acres, or 19 percent are national forest lands under Forest Service jurisdiction.[71] Seventy-two percent of all commercial forest land is under private control and 9 percent is owned by other Federal, State, and local government entities. In 1962 only 18 percent of the growing stock cut in the United States came from national forests, while 75 percent came from lands owned by private interests.[72] Timber cut on private lands is not subject to the minimum specifications and other measures promulgated by the Forest Service to improve utilization and decrease harvesting wastes.

Although the Forest Service does not directly control a majority of the commercial timber cut, the timber harvest from national forests was significant. Wastes produced in harvesting this timber are also of significant volume. For example, it was estimated by Forest Service officials that harvesting operations can result in from 20 to over 300 tons of residual wastes per acre in clearcutting operations, i.e. where all timber in a given area is cut. This generation rate varies widely depending on such factors as geography, timber density, and tree variety.

In 1970, 1,512,000 acres of national forest land were cut by contract; 564,000 of these were clearcut. Assuming 150 tons of harvesting residues per acre are generated by clearcutting operations and 75 tons per acre by operations other than clearcutting, the total amount of harvesting waste generated on national forest land in 1970 was computed to be 155 million tons. Present and future Forest Service procedures and requirements imposed on contractors to reduce harvesting residues can have a significant effect toward reducing solid waste generation.

However, the mere fact that tree-cutting regulations exist that are aimed at achieving greater utilization and reducing residue generation does not assure implementation. For example, the General Accounting Office (GAO) has reported on timber sale practices that resulted in under-utilization of forest resources because existing regulations were not being enforced. A brief summary of GAO findings has been provided below.

The quantity of national forest timber sold is frequently determined by measuring the logs following tree-cutting, a process known as scaling. According to GAO, the timber in the Pacific Northwest Region was scaled either by Forest Service personnel or by personnel of private scaling bureaus authorized by the Forest Service to perform this function. During a 5-year period ending December 31, 1965, scaling bureaus measured approximately 12.4 billion board-feet of timber in this region.[73] Payment by the contractor to the Forest Service was based upon the measurements reported by the private scaling bureaus.

The cut lengths of logs usually exceed the lengths of primary wood products to be manufactured. The excess, called trim, is provided to allow for losses in the manufacturing process because of such things as the presence of dirt and gravel imbedded in the log ends and end-damage caused by loading hooks. Cutting logs with more than the minimum required amount of trim is a wasteful practice because the excess trim is not used in primary wood products production.

Just as the Forest Service sets minimum-end diameter specifications in the timber sale contract, as discussed before, so are maximum permissible trim allowances specified. The contracts also provide a basis for billing timber purchasers for losses in timber volume resulting from logs being cut with trim exceeding that necessary for the efficient manufacture of primary wood products. The charges are imposed by the Forest Service via a penalty fee for wasteful practices.

However, GAO found evidence that scaling bureaus did not reliably record instances of excess trim nor did responsible Forest Service personnel levy the proper penalties when excess trim was disclosed.[74] A rough estimate of the quantity of harvesting waste generated because of this procedure in this region can be made. Assuming the density of wood at 40 lb/cu ft, there are approximately 3.3 lb of wood in 1 board-foot. If excess trim accounted for 2 percent of all timber scaled, then 415,000 tons of unnecessary wood residues were generated in the 5-year period under consideration in the Pacific Northwest Region alone.

It should be pointed out that trim waste ends are readily usable as paper pulp, and a high proportion are chipped for this purpose. Forest Service staff estimate that more than 90 percent of softwood trim-ends go to fiber use.

Manufacturing

Residues from wood product manufacturing processes include slabs, edgings, shavings, sawdust, and bark. In 1962 approximately 43 million tons of such residues generated by primary manufacturing industries were used.[75] Through its activities, the Forest Service helps to reduce the quantity of manufacturing residues.

Research. Use of sawmill residues, particularly in the western United States has increased significantly in the last 10 years. For example, 20 percent of the pulpwood supply in 1962 was derived from plant byproducts,[76] compared with an estimated 30 percent in 1970. The increase in production of particleboard from wood chip residues has reduced the quantity of wood chips discarded. However, substantial amounts of manufacturing residues are not presently utilized and are consequently wasted. Research efforts to devise manufacturing processes that reduce waste quantities and to develop new uses for plant residues are either underway in the Forest Service or are comptemplated.

Bark is a major portion of presently unused plant residues. Some bark is sold for use as a mulch, but this outlet is not large enough to divert all bark from the waste stream. Studies have shown that various chemicals, including wax and oils, can be extracted from bark, although the economics of full-scale operation are not yet favorable. The Forest Service is doing research on the feasibility of composting bark, and continuing studies are underway to characterize the chemical constituents of bark. Also, further research may lead to the development of better construction boards containing significant quantities of bark.

It has been demonstrated that wood residues, after minimum processing to attain desired physical form, can be effectively used as roughage in livestock feed. With more extensive processing, wood can also be converted to a carbohydrate source. Considering that livestock consume approximately 400 million tons of food annually, a beneficial use of large quantities of the wood-processing plant residues is potentially available.[77] Conventional roughage sources, such as hay, silage, and cottonseed hulls, are scarce in many regions and expensive to transport. Roughage materials cost from $20 to $40 per ton, thus, substantial income is possible to a processor selling wood wastes for roughage.

A wood content of 5 to 15 percent has been found to be the optimum range for this residue's inclusion in livestock feed as roughage.[78] Assuming a 5-percent wood residue content in the 400 million tons of feed used per year yields a potential use for 20 million tons of wood residues annually or about 40 percent of the total amount available at processing plants. Thus, livestock roughage appears to be a residue use worth further research and development under Forest Service sponsorship.

No serious research problems exist concerning the use of wood residues for pulp production.[79] Good quality paper can be made from most wood residues with the exception of bark. In this respect, development of an effective chip debarking system, as previously discussed, would increase the quantities of wood residues used in papermaking, as well as in particleboard or flakeboard manufacture, since bark contaminates both paper and particleboard manufacturing processes.

As technology in the forestry industry advances, greater utilization of the logs brought to the sawmill or plant for processing can be achieved. Accompanying the increased utilization may be decreased generation of residues. Both private industry working independently and the Forest Service have contributed to improvements in this respect.

For example, a reduction in the thickness of the saw blade causes a corresponding decrease in the width of the saw kerf, thus reducing the amount of wood cut from a log in the form of wood chips and sawdust. Research into methods of log-cutting that would reduce the saw kerf width was underway by the Forest Service.

Similarly, the Forest Service has worked on the development of a type of sawing system called the chipping head-rig that squares logs by chipping action. The residue from this type of processing consists mostly of wood chips rather than sawdust. Sawdust presently is the most voluminous portion of residue from lumber manufacturing operations. Wood chips are readily usable in particleboard manufacture. They also contain long wood fibers that facilitate pulp production, whereas sawdust has limited use applications because fibers are shorter on the average.

Forest Service research activities in manufacturing technology can influence the level of resource utilization and the related amount of residues generated. For example, in the Pacific Northwest, if timber utilization were improved to a point where trees of 9-in. trunk diameter could be processed into lumber, and if the width of the saw kerf were reduced, the yield of timber products could be increased approximately 11 percent.[80] Presently, softwood sawtimber is a minimum 9 in. in diameter, except in the Pacific Northwest, where the minimum diameter is 11 in. Hardwoods, found mainly in the East, must have a diameter of at least 11 in.

National Forests. Once the timber on a tract of national forest land has been sold by the Forest Service to a contractor, the use or destination of that timber is not under Forest Service jurisdiction. Therefore, the National Forest System activity has minimal influence on wastes generated from processing and manufacturing operations.

However, when it becomes technically feasible to process smaller diameter trees, timber sale contracts can be altered with the addition of a requirement that cull trees and down trees of previously undersized dimensions be included in the sale. In this manner, improvements in manufacturing processes will bring about a reduction in the quantity of solid wastes generated in forest areas.

State and Private Forestry. The Forest Service is working in conjunction with many interested organizations on methods to improve wood product manufacturing processes and utilize wastes. For example, the Forest Products Laboratory of the Forest Service, the Tennessee Valley Authority, and the Universities of Wisconsin, Pennsylvania State, and Auburn have been cooperating on research for the past 4 years to convert wood residues to livestock feed. Each organization was researching complementary aspects of the topic.

As new wood product manufacturing techniques are devised, whether by industry, university, or Forest Service researchers, State and Private Forestry disseminates the information to interested parties. In addition, marketing assistance can be provided to industry to help locate markets for plant byproducts and residues.

Pulping Effluents

Wastes generated from pulp and paper manufacturing plants occur in liquid, gaseous, and solid forms. The largest quantities of waste effluent are in the waste liquors. In some processes (chemical) these wastes contain about one-half of the wood processed as well as the unused or spent chemicals. Approximately 52 million tons of wood fibers are lost annually during papermaking operations. However, as great as this volume is, spent waste liquors are not the most serious pollution problem. Some solids are removed and the subsequent effluents are largely burned in recovery furnaces designed to recover heat and chemicals.

Both gaseous emissions from recovery furnaces and liquid discharges from bleach plant operations are serious problems in the paper industry. The liquid discharges from these plants are too dilute for economical burning or chemical recovery. These pollution problems do not directly involve solid waste generation or recycling, and are therefore beyond the scope of this study.

Solids recovered from waste liquors at paper manufacturing plants are also a problem. The National Forest System and Cooperative Forestry activities have minimal influence on the generation and/or use of solid waste residues from papermaking operations. The research activity of the Forest Service, however, has the resources to study solutions and is currently planning investigations in this area.

Fibers and additives suspended in liquid effluents are the major type of solid wastes. These solid residuals can completely destroy the natural ecology of the receiving waters if allowed to accumulate. (As much as 50 tons per day can be produced by a single mill.)[81] The Forest Service has identified three aspects of the solid waste generation problem;

- Collection of solids
- Disposal of collected solids
- Reduction of solid waste quantities in processing.

The Forest Products Laboratory is planning work on improved collection systems and the development of products made from the collected solids. Pulping waste sludges are very difficult to dewater and, if too moist, cannot be deposited on land because of putrefaction. Although burning has been sometimes used to reduce the volume, the wet sludge is not suitable for disposal by this method. Possible uses for recovered, dewatered pulp mill sludges include use as a constituent in construction board, tile products, and molded fiber products, and as livestock feed. In contrast to wood chip and sawdust residues, most pulping wastes are digestible by livestock. Extraneous materials, such as clay fillers, frequently found in paper manufacturing wastes, are not expected to be harmful to the digestive system of livestock.

The process of chemically pulping wood involves removing the lignin, the material binding one fiber to another, from the wood. The freed individual cellulose fibers can then be matted into paper. Present delignification methods are not selective, thus the amount of wood fibers lost during delignification is equal to or more than the amount of lignin removed. Improvements in this operation would lead to a significant reduction in the quantity of solid wastes generated from paper manufacturing plants. Forest Service research efforts into more selective methods to dissolve lignin are in the early stages.

Another type of paper is made from mechanical pulp, or groundwood. This paper retains most of the lignin; over 95 percent of the wood input to this process is incorporated in the product. Thus, there is little solid waste generated from a plant manufacturing paper from groundwood. Such paper is suitable for newsprint, magazines, and book stock. If the uses for paper made from mechanical pulp were expanded and increased, a reduction in plant residues would result. The Forest Service has expressed an interest in developing improved quality groundwood paper, but little research is underway on this topic.

Product Use and Discard

Forest Service activities relating to solid waste generated as a result of discarded consumer products are in conflict in some aspects. On the one hand, for example, research activities are being conducted on methods of recycling or saving wood fiber in solid wastes, while the same activity area seeks to develop new (sometimes more efficient) uses for forest products, in order to increase value from forests. As an additional encouragement, the Forest Service provides marketing assistance to processors of wood products. Minimal marketing assistance is provided to processors of paper products. Since many wood products, particularly paper products, are short-lived goods and are disposed of after a single use, encouragement of the manufacture of these products is tantamount to encouragement of waste generation.

Research. Because paper comprises approximately 50 percent of municipal refuse, it is a natural target for recovery and recycling efforts. Approximately 10 million tons of paper per year are now being recycled. Virtually none originates from municipal refuse. The Forest Service is cooperating with the Office of Solid Waste Management Programs, EPA; the city of Madison, Wisconsin; and the Bureau of Mines, Department of the Interior; in the development of a processing scheme for the reclamation of cellulosic, as well as mineral and glass wastes from the city's municipal refuse. Except for the successful collection of separated newspapers, the project is still in its early stages. No reliable scheme has yet been commercially adapted to effect economical recovery of resources from municipal wastes. The goal of the Forest Service in this program has been to develop and test a prototype cellulose-recovery system. The project has been budgeted at approximately $230,000 for 1971, compared with the total Forest Service research budget of $48.8 million.

The goal of this program is admirable and necessary. It should be recognized that the most beneficial result of recycling cellulosic wastes is a corresponding reduction in the quantity of solid waste materials requiring disposal. Claims that "recycling paper will save trees' are invalid in the sense that they are generally used. The mind envisions virgin forest land saved from the ax because newsprint has been sent back to the plant for reuse. In reality, much paper is made from trees grown as agricultural products on private lands, and if a tree is planted to replace each tree cut, the overall adverse effects are temporary and minimal. Trees will be harvested regardless of the recycle rate, because trees cannot be saved indefinitely. They are living organisms and, if left to nature, will grow old and die. Even in the case of virgin, "wild" forests, cutting may be deferred, but in the long run the tree will either be harvested or fall from disease or old age. As long as the rate of growth is more than or equal to the demand, wastepaper recovery from municipal wastes will not reduce the number of trees cut for pulpwood.

Paper recycling to recover the wood fiber for reuse in paper and paper products will become increasingly necessary in the future to meet the growing demand for paper consumer goods. The demand for wood and its products continues to increase, and projections indicate that it will more than double by the year 2000.[82] Softwood and hardwood cut is predicted to exceed growth by 1990.[83] As demand exceeds supply, secondary sources (recycling) must be utilized to satisfy consumer demands. However, calls by conservationists and others to increase the present 20-percent recycling rate in this country are based on an anticipation of future requirements, rather than immediate resource needs or economics. There is presently an abundance of virgin pulpwood supplies. Wood pulp is cheap and so is wastepaper. When pulp becomes more scarce, and if the demand for paper products continues to increase as predicted, wastepaper will become more valuable and subsequently may be economically recycled to a greater degree than now.[84]

Until the time when paper companies demand significant quantities of wastepaper reclaimed from municipal refuse, the wastepaper collected will be difficult, if not impossible, to market. Forest Service research can help to encourage paper recycling by improving the economics and technical factors related to its reuse. For example, if newspapers contained in municipal refuse were recovered and reprocessed into newsprint, a twofold benefit would result. Besides reducing the quantity of waste needing disposal, the country could improve its balance-of-payments situation, since most newsprint comes from outside the United States. In 1970 approximately 9 million tons of newsprint were used in the United States, of which 2 million tons were recovered for reuse as paper or in other products.[85] Approximately 6.5 million tons of newsprint were imported from Canada.[86] Canada also supplied this country with large quantities of pulpwood.

In 1970, pulpwood prices were approximately $20 per cord, varying with species.[87] Total pulpwood imports were 1 million cords. Thus, the United States paid approximately $120 million to foreign countries for a product which conceivably could be recovered from municipal refuse. If the 9 million tons of newspapers alone were recovered for repulping, de-inking, and remanufacture, 8 million tons of newsprint could be produced (assuming about 90 percent of the fibers remain after repulping). This represents a saving of more newsprint (the principal paper import) than was imported that year. Thus, there are significant gains to be achieved if Forest Service researchers develop means for the use of wood fiber presently discarded as waste.

National Forests. It has been suggested that the Forest Service, through the National Forest System, strictly limit the sale of its timber and thereby cause an increase in the value of wood fiber found in wastepaper.[88] Unfortunately, this approach would not achieve the desired result, at least not for the near term. As noted previously, the national forests comprise only 19 percent of the Nation's commercial forest lands. Furthermore, most paper produced in the United States comes from integrated manufacturers in the southern States where national forest holdings are minimal (5 percent of commercial forest land). Of the total domestic pulpwood production of 70.3 million cords, 42.4 million, or 60 percent, came from the South. Another 11.6 million cords (16 percent) came from the North, where national forest lands comprise only 6 percent of all commercial forest land. In contrast, the West's commercial forests, 56 percent of which are operated by the Forest Service and representing 79 percent of all national forest lands, produced only 16.3 million cords (23 percent).[89] Thus, paper has been produced predominantly from pulpwood grown on private land or land outside the control or influence of the Forest Service. Restriction of the cut of timber on national forest land will not significantly increase the current demand for wastepaper.

The Forest Service was conducting an experiment which may lead to better control of solid waste generation in national forest recreational areas. At the Boundary Water Canoe Area, a portion of the Superior National Forest designated as a permanent wilderness area, hikers, campers, and canoers may not bring noncombustible disposable products into the forest. The 113,000 visitors in 1969 left many food and beverage packages along trails and around campsites, prompting Forest Service officials to devise a means to protect the wilderness area. All indications are that this system is working well. Visitors carry their food in combustible packaging or in their camp gear containers that are brought out after the visit.

It is interesting to contemplate the potential ramifications of this policy were it to be adopted nationwide and expanded to cover day-use as well as wilderness area national forest recreational facilities. In 1970, there were 67.6 million visitor-days recorded at developed sites in the national forests.[90] In a recent study, it was estimated that 0.92 lb of refuse was generated per visitor-day.[91] Assuming one-half this amount was noncombustible, approximately 15,000 tons of solid wastes annually would not be generated on National Forest lands. The miniscule impact of such policy with respect to total solid waste generation, the difficulty in policing, and the inconvenience to citizens would likely make such a system unworkable in all recreational areas. However, implementation in wilderness areas and other remote forest lands would reduce waste collection costs and scenic blight.

Environmental Impact Statements

Environmental impact statements are prepared by the Forest Service for major timber sales, land exchanges, and other actions that could affect the environment. A sampling of four of these statements indicates that considerable effort was expended in their preparation. The statements fully described the ecology, appearance, history and archeology, and socioeconomics of the national forest. The potential environmental impact is considered as the action would affect the recreation potentialities, scenery, wildlife, vegetation, aquatic habitat, water and air quality, noise levels, and economics. Favorable environmental effects are weighed against adverse impacts and alternatives described, where applicable. Generally, the statements follow the guidelines set up by the Council on Environmental Quality.

Given this extensive coverage, the topics of solid waste generation, recycling, and disposal are conspicuous by their absence. In only one of the four statements reviewed was solid waste disposal mentioned and this was a one sentence assurance that refuse generated in the national forest area would be disposed of properly.

Recommendations

The Forest Service was established to help protect the Nation's forests and is oriented towards forest resource conservation and beneficial utilization. However, changes in existing

Forest Service policies, programs, and regulations could result in more effective resource utilization and less solid waste generation.

- ***All tree-cutting specifications and regulations promulgated under timber sale contracts should be periodically revised to reflect technological advances in industry allowing use of more of the harvest log.***
- ***Timber sale contracts should require more extensive harvesting of marginal down and dead salvageable trees, whenever economically feasible.***
- ***Additional research should be directed toward greater utilization of those portions of harvested trees now wasted.***
- ***Cutting regulations should be more strictly enforced to ensure their intent is being realized.***
- ***Environmental impact statements should specifically consider the quantity of solid wastes expected from Forest Service actions and consider alternative methods of reducing the amount, when possible.***

CHAPTER VI

GENERAL ACCOUNTING OFFICE

Abstract

The General Accounting Office (GAO) is empowered to audit most departments and agencies of the Federal Government. Through its activities, GAO frequently reports on governmental inefficiencies and wastefulness; a primary goal of GAO is to assure that taxpayers' dollars are utilized efficiently.

Agency practices that are wasteful dollar-wise may also be wasteful of resources. In such cases, GAO inadvertently acts as a watchdog for Federal activities that are counterproductive to resource recovery goals. In addition, GAO has satellite staffs permanently assigned to the EPA and the Army Corps of Engineers that can provide further specialized assistance in identifying Federal actions inconsistent with the national environmental policy in general, and solid waste management goals specifically.

Background

The General Accounting Office (GAO) was established in 1921 when audit authority of the Federal Government was consolidated into a single agency. GAO was empowered to audit all departments and agencies of the Federal Government except for various banking and currency activities. Books, documents, papers, and other records of the departments and agencies are available to GAO in conducting audits.

As an independent agent of Congress, GAO assists in providing control over the receipt, disbursement, and expenditures of public monies. In addition to its primary mission of agency performance reviews, GAO also provides the following services:

- Special assistance to Congress
- Legal services and decisions
- Financial management improvement studies
- Financial auditing of government contractors and settlement of accounts
- Promulgates rules and regulations.

The relationships between GAO's duties and governmental influence on solid waste generation and recycling are subsequently discussed in three sections:

- Agency fiscal and performance audits
- GAO's Environmental Protection Agency staff activities
- GAO's Army Corps of Engineers staff activities.

Agency Fiscal and Performance Audits

Acting either on its own initiative or at the specific request of a member of Congress or a Congressional committee, GAO investigates instances where Federal agencies may be operating inefficiently. Economy, efficiency, and effectiveness are the criteria used by GAO in its investigations.

Initially, GAO conducts a preliminary investigation. A full-scale investigation is conducted if results of the preliminary investigation so indicate. The alleged inefficiencies are investigated and documented. Recommendations are prepared on methods to correct the deficiencies. The audited agency is then provided the opportunity to respond to or act upon the recommendations before the findings are presented to Congress.

GAO representatives indicated that frequently those policies designed to effect maximum utilization of government property are not enforced. Thus, beneficial usage of government property is not realized to the level desired. The following examples of previous GAO audits are illustrative.

Reusable ammunition covers.[92] In 1965, GAO reviewed Navy use of Mark IV projectile fuse covers. Many types of ammunition are shipped from naval ordinance plants or depots to the fleet with covers attached for protection. These protective covers are reusable after firing of the projectile. GAO found during its investigation that only about 20 percent of the estimated 289,000 fuse covers were returned. The approximately 231,000 brass and steel covers lost over the 5-year study period required replacement at an estimated cost of $595,000. Losses of other reusable items were also identified, but not documented. To correct this situation, GAO recommended that appropriate accounting controls be instituted by the Navy supply system.

In this instance, GAO action to prevent unnecessary expenditures of Federal funds resulted also in resource conservation and a reduction in solid waste generation.

Motor vehicle tires.[93] The Air Force has found that under certain conditions significant savings can be realized by using rebuilt or recapped tires. Air Force Technical Order 36Y32-1-122 directed that reuseable motor vehicle tires be rebuilt or recapped rather than replaced with new tires. However, GAO found that Air Force personnel responsible for tire inspection allowed excessive tread wear to occur, thus damaging many carcasses beyond the point where recapping could still be accomplished. Also many tires were condemned although they could have been rebuilt. In a 1964 survey of tire usage at 80 Air Force installations, it was found that nearly 80 percent of the installations met less than 50 percent of their new tire requirements with recapped or rebuilt tires.

GAO sources indicated that 90 percent of all carcass damage occured during the last 2/32 in. of tread life. This damage prevents the recapping of the tire. So, even though the Air Force had a written policy to encourage reuse of resources, implementation was inadequate.

Following GAO's recommendations, the Air Force instituted a policy to require periodic tire inspection to help prevent carcass damage. Conclusions of this investigation were furnished to the Army and Navy also. GAO respresentatives indicated that the Air Force actions should result in substantial savings.

GAO also investigated the extent to which used tires were salvaged by the military services in Europe.[94] It was found that the Army and the Air Force in fiscal year 1969 had a total requirement for 107,836 tires. About 48 percent were rebuilt. It was estimated that a savings of $1,040,000 could have been realized if 75 percent of the requirement had been supplied by rebuilt tires.[95] This represents 28,500 more tires reclaimed. Action was taken by the military to remedy this situation, but the results have not yet been documented. The Department of the Army has estimated that 75 percent of all Department of Defense tire replacement requirements can be met by utilizing retread tires at an annual savings of approximately $20 million.[96]

Excess aircraft engines.[97] Air Force regulations require that excess engines should be disassembled to obtain component parts needed for other engines whenever practical and economical. However, because of administrative deficiencies, GAO found that many parts were not reclaimed and were condemned to scrap along with the remainder of the engine. Thus, the full resource value of the needed parts was not realized. At the recommendation of GAO, the Air Force took remedial action and redirected valuable resources from condemnation to reuse.

Controls over timber cutting practices.[98] As discussed in Chapter V, certain minimum requirements are imposed on trees cut by contractors from national forests. These requirements are intended to promote optimum use of harvested timber under the market conditions and industry practices prevalent in the area. During an investigation of the cutting practices of contractors in the Douglas Fir subregion of the Pacific Northwest Region, GAO found that noncompliance with one requirement pertaining to trim allowances was widespread. It is estimated from GAO figures that as much as 95,000 tons per year of logging waste was created because of this noncompliance. GAO recommended that the Forest Service establish appropriate control procedures to ensure proper enforcement of the specific regulations studied. Thus, GAO action may lead to greater utilization and a resultant reduction in residue quantities.

Currently under study by GAO is the potential for decreasing the volume of wood material being left in timber sales areas administered by the Forest Service and the Department of the Interior.

Through its normal audit and survey work GAO routinely uncovers instances where governmental agencies generate excessive solid waste or otherwise contribute to a misuse of resources. An important aspect of governmental activity with respect to resource recovery goals is also evident; that is, the existence of regulations and policies directing steps to be taken to conserve material or recover potential waste do not in themselves insure accomplishment of the desired goals. Inaction or lax enforcement can render well-intentioned regulations useless.

GAO–EPA Staff Activities

For many ongoing Federal programs, GAO has a separate staff permanently assigned to facilitate audits and also to cooperate with the agency in fulfilling its mission. The GAO–EPA staff has established itself as a cooperative partner with EPA. Unlike many of the GAO special staff assigned to other agencies, the GAO–EPA staff is primarily concerned with effectiveness of EPA administered programs. About 80 percent of GAO–EPA staff effort is placed on evaluations of EPA program effectiveness while only 20 percent is on program economy and administrative efficiency. The reason cited by GAO for this situation is that the bulk of EPA's budget is allocated to water pollution control construction grants and Congress has expressed continued interest in the effectiveness of these grants.

To assure the most effective cooperation with EPA, the GAO–EPA staff meets with EPA upper management personnel at 6-month intervals to discuss priorities and receive guidance on all investigations planned or underway. According to GAO personnel, topics including solid waste management and resource recovery are discussed during these meetings.

Since establishment of the GAO–EPA staff, GAO has studied the following aspects of EPA's activities:

- Programs related to automobile-caused pollution
- Water pollution programs
- Air pollution programs
- Solid waste demonstration grant programs
- Solid waste management practices at selected Federal facilities.

The latter investigation has two primary objectives. The first is a study of procurement policies and practices employed by the General Services Administration (GSA) and the U.S. Army and their effect on the generation of solid waste and recycling. Examples of specific commodity procurements under investigation are returnable containers, recappable tires, and paper containing recycled fibers. The second objective is to document the solid waste management practices at representative facilities. Those agencies under study in this phase are the U.S. Army, Forest Service, Bureau of Land Management (BLM), and the National Park Service. The study is designed to determine present disposal practices.

In gathering information for this study, GAO interviewed pertinent agency representatives in three different regions. The type of data amassed is indicated by the following topics:

- Physical appearance of the disposal sites
- Working conditions and personnel skill
- Attitude of responsible personnel
- Feasibility of eliminating disposal areas by combining nearby sites
- Feasibility of practicing recycling.

Also considered, but to a lesser degree, were waste collection practices.

All field work has been completed and a draft report is in preparation. The study results were not available since it is the policy of GAO not to release information until the affected agencies have an opportunity for review and comment. GAO officials do indicate, however, that they found solid waste disposal practices to vary considerably from agency to agency and region to region. Also, GAO expects to include both specific and general recommendations for improvement in the report. It was anticipated that an advance draft of the report would be provided to EPA and that informal discussions between EPA and GAO about this study would be held prior to the end of 1971.

GAO–Army Corps of Engineers Staff Activities

At the request of a Congressional committee, GAO is studying the manner in which certain Federal agencies are implementing Section 203 of Public Law 91-190, the National Environmental Protection Act of 1969 (NEPA). Section 203 calls for the preparation of environmental impact statements for major Federal projects that could have adverse effects on the environment. The Congressional request first specified that the Army Corps of Engineers be studied by GAO to determine whether Congressional intent, expressed in P.L. 91-190, was in fact being implemented. GAO assigned its permanent GAO–Corps of Engineers satellite staff (analogous to the GAO–EPA staff) to the project.

It was subsequently decided to broaden the scope of the investigation to include other agencies and their activities with respect to NEPA. These were to include the following seven agencies:

- Department of the Army–Corps of Engineers (civil functions only);
- Department of Agriculture–Forest Service and Soil Conservation Service;
- Department of Housing and Urban Development (new communities and urban renewal programs);
- Department of Interior–Bureau of Reclamation;
- Department of Transporation- Federal Aviation Administration and Federal Highway Administration;
- Council on Environmental Quality.;
- Office of Management and Budget.

The latter two agencies are being evaluated to assess their effectiveness in providing assistance to operating agencies. Each of the other agencies is being investigated to determine if environmental impact statements are being prepared as required. Representative statements will be studied to see what factors were considered. GAO will also determine the extent to which the impact statements are utilized by the agency as a decision tool.

Investigation of field rather than headquarters level activities will be emphasized. One or two field offices (as applicable) in each of the agencies will be studied. GAO plans to prepare schematic drawings illustrating the decision points used in the preparation of environmental statements. To facilitate this aspect of the study GAO will trace the development of a select number of previously prepared statements from the project's conception and initiation to statements preparation and distribution to necessary parties. The public hearing process will also be included.

The project was initiated in September 1971, and was expected to be completed by January 1972. A final report was scheduled for release in April 1972. GAO has estimated 3,000 man-days of effort will be expended on the project.

In the opinion of a GAO–Corps of Engineers staff representative, solid waste aspects should be considered in environmental impact statements covering projects where solid waste generation is significant. Accordingly, it is expected that this will be a recommendation in GAO's final report.

Recommendations

- *The GAO–EPA satellite staff should periodically review GAO audits and special study reports to determine instances in which inefficient Federal agency actions may, in turn, cause excessive solid waste generation.*

  GAO's audits and other studies are quite detailed and often identify agency policies and regulations that are responsible for inefficient practices. Excessive generation of solid wastes often results from these practices, as illustrated by examples cited. EPA's Federal facilities activity could assist the agencies identified by GAO in remedying wasteful practices and in encouraging resource recovery.

- *The GAO–Corps of Engineers staff should specifically consider the solid waste generation and recovery aspects of Federal projects during its present investigation of environmental impact statements.*

CHAPTER VII

INTERSTATE COMMERCE COMMISSION

Abstract

Businessmen engaged in the recovery, processing, and sale of secondary materials have frequently stated that existing freight rates are too high for the profitable transport of their products. They point out that freight rates for competing materials originating from virgin resource suppliers are lower. It is said that this alleged rate discrimination in effect causes a reduction in the quantity of resources recovered from solid wastes and that freight rate adjustments would stimulate recycling nationwide and correspondingly reduce waste generation.

The Interstate Commerce Commission (ICC) exercises certain influence over the freight rate structure in this country. In this chapter the alleged rate discrimination issue is discussed, and the possible role of ICC in stimulating resource recovery through freight rate manipulations is examined. Other potential ICC stimuli, in addition to rate adjustments, such as granting special operating authority and conducting special investigations, are also discussed.

Background

The Interstate Commerce Commission (ICC) was created under the Interstate Commerce Act in 1887 to regulate carriers engaged in interstate surface transportation of people and freight.[99] Eleven Commissioners direct the various activities of the ICC, including:

- Adjudication of issues related to rate and service changes and other factors
- Rulings on applications for mergers, consolidations, and sales of transportation companies
- Prescription of accounting rules and railroad equipment usage
- Administration of laws relating to railroad bankruptcy
- Issuance of certificates granting motor carrier operating authority.

Regulatory control of transportation became necessary when, in the late 19th century, railroads almost held a monopoly on transportation service. Cartels developed and undercutting, rate discrimination, and other practices detrimental to both the shipping public and railroads themselves were prevalent. The Interstate Commerce Act, among other things, prohibits unjust, unreasonable, and undue discrimination or preference to different shippers for the transportation of commodities.

The ICC has regulatory control over all interstate railroads, 39 percent of motor carriers and 19 percent of inland water traffic.[100] Those carriers not regulated by ICC include intrastate and company-owned trucks, railroads, and barges; carriers of certain agricultural products; and barges carrying three or fewer bulk commodities. Intrastate movements are regulated by State public utility commissions or similar agencies. Other carriers are not regulated by ICC. The ICC budget for fiscal year 1971-72 was approximately $27 million.[101]

Relation of ICC to Solid Waste. The price of commodities reflects the raw material cost, processing or manufacturing cost, and transportation charges. For some commodities, such as secondary materials, transportation costs are a significant percentage of the secondary material price. Thus, when freight rate increases occur, the F.O.B. prices of secondary materials increase proportionately more than do prices of commodities for which relative transportation costs are less significant.

The ICC follows specific procedures in its activities. Before investigating the possible effects of this agency on movements of secondary materials, it is beneficial to outline the rules by which ICC operates.

Rate Increase Procedures. The Interstate Commerce Act permits carriers to make rate changes by publishing a tariff stating the new rates, filing the tariff with the ICC, and posting the tariff in the carriers' freight stations. Ordinarily, rate changes cannot be made effective until 30 days after the tariff is filed with the ICC.

If shippers or other interested parties feel that proposed changes in rates are unlawful, they may file a protest with the ICC. If no protest is filed, the proposed rates may be allowed to go into effect, although the Commission may act on its own motion to prevent this. In the event that a rate change is protested, an investigation will be instituted whenever there is reason to believe that the change proposed would be unlawful. If an investigation is begun, the ICC may also suspend the proposed rate for 7 months beyond the date it is scheduled to go into effect. Thus, when rate changes are proposed, the ICC may:

- Take no action, thus allowing the rate to go into effect
- Investigate, thus permitting the rate to go into effect subject to later revision by the agency in the light of the evidence
- Investigate and suspend, thus preventing the rate, or some portion thereof, from going into effect during the course of the investigation, but the suspension may not be longer than 7 months.

These actions of the Commission may be appealed. If the rate change is suspended and/or investigated, the decision after hearing, may be appealed within the Commission at least once. When administrative remedies have been exhausted, the decision may be appealed to the courts.

To the extent that the ICC can control rate increases, it has an effect on freight rates. It has been alleged by shippers of secondary materials that the ICC hinders the recovery of valuable resources by allowing the rates for shipment of virgin materials to be unreasonably lower than the corresponding rates for secondary materials.

Since freight rates are determined through adversary proceedings, the issues involved in such proceedings are examined herein to illustrate the influence ICC may exert on secondary material freight rates. Iron ore and scrap iron and steel movement by rail will be discussed as representative of secondary materials to illustrate alleged discrimination in freight rates between virgin raw materials and corresponding secondary materials. These materials were chosen because scrap iron and steel represent the most widely used secondary material: 26.7 million tons were transported by rail in 1968.[102] In 1969, approximately 95 million tons of iron ore moved by common carrier and industry-owned rail.[103] Much of the ore moves both by barge and rail according to railroad officials, as discussed in the section *Position of Railroads.* The ICC has no authority over the rates governing the preponderance of domestic water transportation. There is little compiled data available to indicate transport rates of other competing virgin and secondary materials.

Motor carrier transportation was not investigated. Although most unprepared scrap is hauled to scrap processing yards by truck, 74 percent of the processed scrap moves to steel mills and foundaries by rail.[104] Scrap industry representatives indicate that scrap iron can sometimes be economically shipped by truck for distances up to 125 miles; however, there is no rate discrimination reported for this mode of transport over these distances. In addition, little iron ore and processed scrap move by motor carrier. Trucking officials indicate that 11,800 tons of iron ore were moved by motor carrier in 1969.

Position of Scrap Iron and Steel Industry

Solid Waste and the Scrap Cycle. There are two basic sources of ferrous scrap: home and purchased scrap. The latter includes both prompt industrial and obsolete scrap. Home scrap, generated at the steel mills, normally does not leave the mill and is readily reused. Industrial scrap is generally bought by the mills from fabricators for almost immediate reuse as a raw material. However, fabricators sometimes cannot sell their scrap and have been known to dispose of low-grade material as solid waste. Both home and purchased industrial scrap are generated in concentrated locales and can thus be readily introduced back into the steelmaking process.

On the other hand, obsolete scrap is generated at widely diverse locations, where economic activity results in use and discard of steel-containing objects. Unless the price received for obsolete scrap is sufficient to offset costs of collection, processing, and transportation, the scrap will remain an unused resource, deposited in disposal sites and auto graveyards throughout the country. Obsolete scrap accounts for 23 percent of all scrap used.[105]

Increasing the utilization of obsolete scrap depends on many factors. Presently, steelmaking processes use varying amounts of scrap in manufacturing steel and cast iron. The amount depends upon the type of process, market price and availability of materials used in the process, and other factors. When the open hearth method of steelmaking is used, a 30 to 50 percent charge of scrap (home, industrial and/or obsolete) is used. Molten steel (referred to as hot metal but often mistakenly called pig iron) provides the balance. Basic oxygen furnaces use a 10 to 30 percent scrap charge with the balance being hot metal. Electric furnaces using up to 100 percent scrap are frequently found in the smaller mills, especially those in the South.

Rail Transportation in Relation to Scrap Sales. Reference hereafter to scrap refers to obsolete ferrous scrap, and the industry that handles obsolete scrap. Scrap processing facilities are usually built with access to a rail line, as are most steel mills. Normally, unprepared scrap is trucked to the processing yard and the prepared end-product shipped to the steel mills by rail. Because most mills will not accept scrap delivered in trucks, scrap processors are dependent upon railroads. The scrap industry contends that scrap and iron ore directly compete for markets and that a basic competition factor favoring iron ore is the dichotomy of transportation charges and services associated with each commodity.

Rates. The ICC generally supports the concept that differences in transportation rates should not alter the competitive standing of the alternative inputs to any manufacturing process. The scrap industry contends that rail rates are presently biased in favor of iron ore, contrary to equity considerations. As a basis for this contention, the scrap industry compared ICC data on the total revenue railroads received from ferrous scrap shippers and the total weight hauled, cars used, and miles hauled in moving this commodity nationwide, to similar data, also obtained from the ICC, for iron ore. The latest available data were for 1966. Table 5 presents the results of these comparisons made by regions.[106] Table 6 amplifies the nationwide figures and shows revenues by other bases.[107]

Recognizing that iron ore has an iron content of approximately 60 percent, while scrap is 90 percent iron, the third column of Table 5 was computed to compare these commodities in terms of a common parameter–iron content. The iron ore revenue figures in the second column of Table 5 were multiplied by (90/60) or 1.5 to give the tabulated figures based on iron content, as shown in the third column. These are the revenues that the scrap industry claims railroads should realize from scrap transportation if equitable rates were charged to scrap shippers.

Since scrap dealers sell their product on a weight basis, the first column in Table 6 is meaningful to the scrap dealer. It indicates that the railroads received an average of $0.206 per 100 lbs or $4.12 per ton in revenues for hauling ferrous scrap in 1966. The corresponding figures for virgin iron ore are $0.082 and $1.64, respectively. On an iron content basis, the rate for scrap should be $2.46 per ton (1.5 x $1.64). The difference, $1.66 per ton ($4.12 minus $2.46), represents the alleged discrimination against scrap iron shippers. In other words, on a weight basis, it costs about 68 percent more to ship the iron content in scrap than in iron ore.

TABLE 5

RAILROAD REVENUE FOR SHIPPING IRON AND STEEL SCRAP AND IRON ORE (1966)[106]

Movements	Revenue per ton ($)			Discrimination per ton ($)†
	Scrap	Iron ore	Iron ore corrected*	
National	4.12	1.64	2.46	1.66
Regions				
East	3.78	2.22	3.33	0.45
South	3.76	1.90	2.85	0.91
West	4.40	0.93	1.47	2.93
Mountain	4.02	2.54	3.81	0.21

* Revenue on a per ton of iron content, computed by multiplying the revenue per ton of iron ore by 1.5. The natural iron content of ferrous scrap averages about 90 percent and averages about 60 percent for iron ore.

† Differences between 1966 revenue for iron and steel scrap and corrected iron ore rate.

Regardless of the basis of calculation, the figures in Table 6 illustrate that more income was generated per lb, per car, per car-mile, and per ton-mile by hauling scrap rather than iron ore. Accounting for the differences in haul distances involved for scrap iron versus iron ore shipments, Table 6 shows that the overall unit cost for shipping scrap was $0.02865 per ton-mile, while the corresponding cost for iron ore (corrected for ferrous content) was $0.01785 per ton-mile. Thus, on an average ton-mile basis, scrap iron costs about 35 percent more than iron ore to ship. Therefore, according to the scrap industry, the rates for scrap movement are, on the national average, too high to allow fair competition with iron ore. Accordingly, all available obsolete scrap cannot be sold and an unknown quantity is discarded as waste.

The preceding figures are artificial rates, calculated from revenue data to obtain an indication of the average dollars paid for transportation by the scrap and ore industries. The artificial rates are representative of actual movements and revenues averaged for the country, and are more meaningful than published rates, insofar as the total freight costs charged to all scrap processors, miners of ore, and steel mills are concerned. Published rates may sometimes indicate that shipping charges for the two commodities are not so diverse, or are more diverse, over specific routes using specific equipment. However, there is no indication that any actual movements are made over the designated routes at the published rates.

TABLE 6
COMPARATIVE UNIT REVENUES REALIZED BY RAILROADS IN 1966[107]

Commodity	Average revenue per 100 lbs. $	 Car $	 Car-mile $	 Ton-mile $
Iron and steel scrap	0.206	218	1.486	0.02865
Iron ore	0.082	125	0.915	0.01187
Iron ore based on ferrous content	0.123	NA	NA	0.01785

Service. In addition to rate discrimination, scrap shippers complain that the railroads provide inferior service to their industry. Major complaints include:

- Excessive transit time
- Terminal delays
- Car shortages
- Bad-order cars
- Bunching of cars

For example, scrap moves almost exclusively by gondola cars. This class of rail car declined in total numbers from 294,202 in 1955, to 192,238 in 1970, a 35 percent decrease.[108] Also, railroads sometimes deliver cars in groups, rather than distributing delivery evenly over a period of weeks. Scrap shippers usually require a steady supply of gondolas so that processed material can be directly loaded into the cars. With bunching, the processed scrap is sometimes handled twice, thereby increasing costs. Also demurrage charges are levied on rail cars being loaded at the scrap shippers yard over a period of time. Scrap shippers contend that these problems significantly hinder the shipment of scrap.

Position of Railroads

Railroad officials essentially agree with the data developed by the scrap industry. More revenue is generated for each ton of scrap hauled than for iron ore. However, the carriers believe their costs to move iron ore are less than for scrap. They can, therefore, charge less to haul iron ore. Reasons cited for lower costs are:

- Ore is frequently shipped in trainload lots on a prearranged schedule
- Loading and unloading facilities for iron ore are highly mechanized, allowing cars to be loaded more quickly than those for scrap.
- Origin points for iron ore are limited, thereby allowing the railroads to readily schedule future car use
- Scrap may travel longer distances and/or over more expensive routes because scrap is widely distributed geographically
- By having more competitive charges for commodities being shipped in large quantities, such as iron ore, the carriers will ship still larger quantities and thus increase profits dollarwise, but with a lower profit as a percentage of sales. Price elasticity is a major consideration in determining actual rates to charge.
- Payload differences of hoppers (100 tons of iron ore) and gondolas (50 to 60 tons of scrap iron) allow more economical operation.

In contrast to the scrap dealer, the rail carriers consider the unloading and loading costs, distance hauled, payload of the rail car, and competing modes of transportation. Referring again to Table 6, in 1966 the average revenue per car for scrap iron and for iron ore was $218 and $125, respectively. On the basis of car-miles, the rates for scrap iron and iron ore were $1.486 and $0.915 respectively, a 38 percent differential.

Movement of iron ore by rail competes directly with movement by water. In 1969, 95 million tons of iron ore moved by rail and about 127 million tons moved by water. Of the water movements, 46 million tons were imported and about 81 million tons (85.6 million tons United States and Canadian movements on the Great Lakes less 4.6 million tons Canadian consumption in the Great Lakes region) moved on the Great Lakes.[110, 111] Since the 1969 receipts of iron ore at United States iron and steel plants totaled 141 million tons, much of the ore shipments were bi-modal.[112] In fact, many movements may have entailed two transfers, being shipped by rail from mines to the Great Lakes, barged across the Great Lakes, and then moved by rail to the iron and steel mills.

In other cases, ore is barged directly to the mills, either after transfer from a deep-water vessel, or from a rail siding. In some instances, rail carriers have attempted to compete with barge carriers by setting exceptionally low rates. However, unless there are extenuating circumstances, barge carriers with their high volume payloads and low unit costs, provide the service. This illustrates that rail carriers serve a secondary (but vital) role to barges for movement of iron ore, and exemplifies the competitive situation of the carriers.

Furthermore, the railroads contend that scrap iron and steel do not directly compete with iron ore, but with pig iron and crude metallic iron. Pig iron is a high iron content material made by steel mills from iron ore, coke, and limestone from which steel is subsequently manufactured. Its chemical constituents are similar to hot metal. Crude metallic iron is a high iron content (90 to 95 percent) pre-reduced ore. It is mined and reduced in Canada and Venezuela. Small quantities are being shipped to two new steel manufacturing mills. The mills can process the ore without use of a blast furnace, making crude metallic iron highly desirable as a commodity.

The railroads presented the following computation to show the total transportation charges on the materials required to produce one ton of pig iron. These are prices for 1970 for the Eastern Region.[113]

Commodity	Quantity (tons)	Rate (per ton)	Amount ($)
Iron ore	1.800	$3.00	$5.40
Coke	0.730	5.00	3.65
Limestone	0.220	3.00	0.66
Scrap iron	0.056	5.12	0.29
Total			$10.00

The freight rate for scrap iron alone in the Eastern Region was $5.12 per ton, while the total rate to transport all commodities needed in the production of one ton of pig iron was $10.00. Therefore, the railroads felt that there was no rate discrimination against shippers of scrap. Scrap industry representatives claim these computations are erroneous. Alternate computations show that estimated freight rates in 1971 were about $6.13 per gross ton for scrap compared to $4.47 per gross ton for iron ore (adjusted for iron content).[114]

Position of ICC

In its position as judge and jury, the ICC hears the contentions of both shipper and carrier in regard to rate and service cases. Decisions by the Commission are based primarily on the evidence presented at the hearings.

Section 15A of the Interstate Commerce Act specifies that carriers' rates be established to generate sufficient revenue to allow the carriers to provide adequate and efficient service to the public. If rates to ship certain commodities over given routes are not adequate to cover the cost of service, rates for other commodities will have to be high enough to cover those losses and still provide a reasonable profit.

According to officials representing the ICC, a rail carrier, and the scrap industry, there is a trend toward establishing rates on the basis of cost of service. In judging rate reduction requests, cost of service is normally the principal criterion considered by ICC. For rate increases, cost of service, including value of the commodity and other factors are considered.

In requesting approval for rate changes, rail carriers and/or their freight bureaus normally complete "Out-of-Pocket Rail Form A," either when the issue is introduced or during adversary proceedings. This form is sometimes also used by protestants to show why rate increases should not be allowed. Carriers other than rail carriers, or their rate bureaus, use other standard forms for the same purpose. This provides a standardized format for justifying costs, and facilitates review by ICC cost analysts. The ICC is not staffed to perform audits of carriers' costs; their review is limited to analyses of carrier-supplied figures.

Although the scrap shippers contend that the basic rate structure is discriminatory and should be changed, this complaint has not been brought before the Commission for two main reasons.

- A complaint before the ICC to change a basic rate is a costly and lengthy procedure, lasting possibly 2 years or more.
- The burden of proof is on the challenger, making the case very difficult to prepare.

On the other hand, the railroads have proposed five general rate increases within the past 4 years. In these cases, the burden of proof is on the carriers to show cause why the increase should be levied on a protestant's commodity. The scrap shippers contend that an across-the-board percentage rate increase on iron ore and scrap iron alike would result in further increasing the difference in rates between the two commodities. For example, a 10-percent increase in a $5-per-ton rate and a $3-per-ton rate will result in new rates of $5.50 and $3.30 per ton, respectively. Whereas before the increase, the difference in rates was $2 per ton, after the increase the difference would be $2.20. Shippers requested ICC to grant a hold-down on the rates for scrap iron so that the percentage rate increases for iron ore are greater than for scrap, but the actual increases, on the average, would be no more than the average increase on iron ore.

In two of the recent general rate increase hearings, Ex Parte No. 256 and Ex Parte No. 259, the ICC partially recognized the complaints of scrap shippers and granted hold-downs on scrap iron and steel rates, while allowing maximum increases for iron ore shipments. In Ex Parte No. 265 a $0.15 hold-down on scrap was voluntarily introduced by railroads in the South, but this was later rescinded. Action taken during the most recent proceedings, Ex Parte No. 267, is briefly described below.

Ex Parte No. 267. The railroads requested a general rate increase of 15 percent. Responding to scrap iron and steel dealers who requested hold-downs, the ICC noted the following. "Between 1961 and 1966, when there were no general freight rate increases, the price of scrap fluctuated between $24 and $39 per ton. The price of No. 1 heavy melting scrap increased from $27.64 per gross ton in 1967 to $43.50 in 1970, an increase of nearly 60 percent, in spite of the increased freight rates during that same period. The prices of pig iron and iron ore advanced only slightly."[115] The Commission was not persuaded, therefore, that rail freight rates have any significant impact on the "decisions which result in removal of wrecked automobiles and other scrap metals pursuant to antipollution measures."[116] In the same proceedings the Commission noted:

> The National Environmental Policy Act of 1968 (P.L. 91-190) expresses the concern which the Federal Government and the Nation as a whole have with control of activities which result in pollution of the atmosphere and environment. Our attention has been called to the possibility that increases in freight rates and charges may tend to restrict the movement of scrap and waste materials and thus, indirectly, detract from efforts being made to gather and recycle such materials. We are urged to take into consideration, in proceedings such as this, the need for encouraging the shipment of pollutants such as scrap iron and steel, nonferrous scrap and alloy scrap, petroleum wastes and other secondary materials.
>
> It is unnecessary to elaborate upon the importance of the program instituted by the National Environmental Policy Act, or the severity of the problems with which it is concerned. We share that concern and, to the extent that it lies within our statutory authority, propose to assist in the implementation of the objectives of the act . . . . At the same time, we deal with the national need for a viable transportation system, and the constitutional rights of all parties to these proceedings to a full and fair hearing and a decision based upon the evidence of record.[117]

Furthermore, the ICC has taken the position that the transportation industry should not support the control of pollution created by other activities of the economy by providing shipment of waste materials at or below the cost of service. However, the Commission believes "that the transportation industry, like other segments of the economy, must contribute to the control of pollution."[118] Accordingly, the rate increase applied to iron and steel scrap was limited to 11 percent, versus 14 percent for iron ore. Pig iron was also subject to this lower rate increase for equity purposes. Interestingly, the 11-percent increase on scrap amounted to $0.61 per gross ton while the 14-percent increase on iron ore amounted to $0.40 per gross ton, a 1.51 ratio.[119] This figure is also the average ratio of iron content in scrap versus iron ore.

In addition to iron and steel scrap, the ICC granted lesser rate increases for the secondary commodities shown below.[120]

Commodity	Maximum permissible increase (%)
Fly ash	8
Petroleum waste products	8
Nonferrous scrap	11
Textile scrap	11
Paper scrap	11

It is interesting to note that the Department of Transportation (DOT), testifying in Ex Parte No. 267, urged that the requested full rate increases be approved. DOT noted that the railroads' revenue needs were well documented. Even if full rate increases were granted, according to DOT, the rate of return on investment would remain below levels necessary to assure railroad service improvements.[121]

Overview of Scrap Iron and Steel Shipping

It appears that the ICC has taken preliminary steps to establish freight rates for transportation of secondary materials at levels to encourage resource recovery. However, in proceedings granting a rate increase for secondary materials that was less than that generally applied to most other commodities, the Commission noted that "there is no basis in the evidence for finding that the proposed (full) increase on iron and steel scrap will be detrimental to the antipollution program (sic) because of any resulting advantage to the movement of iron ore."[122] Yet a partial rate increase for ferrous scrap was approved so that, ostensibly, more scrap would move from disposal sites to markets for reuse. The implication is that steel manufacturers would demand more scrap for its processes if total delivered scrap prices were lower than competing raw materials. Since the only other source of raw ferrous material for steelmaking is iron ore, the implication noted above is in conflict with the ICC's statement that "scrap iron and iron ore (do not) specifically and directly compete . ."[123]

Unfortunately, no information is available to indicate the total quantity of ferrous scrap (or any secondary material) that would move toward recycling or reuse (rather than as litter and for disposal) if the ICC were to determine that iron ore and scrap compete directly and were to act accordingly to equalize the freight rates. The development of such data was not within the scope of this project. The Institute of Scrap Iron and Steel is reportedly developing such estimates by computer analysis, but the results were not to be available until late 1971.

A Department of Commerce study in 1966 indicated that "the full amount of most types of ferrous scrap originated is consumed, as well as about 85 percent of automotive and similar scrapable materials."[124] Assuming a high estimate of 20 million total out-of-service automobiles in salvage yards and in numerous unauthorized locations throughout the country and 1 ton per automobile, there are 3 million tons of scrap iron and steel which would remain unrecovered. Rate adjustments could result in the reclamation of additional amounts of scrap iron and steel and tend to reduce the 20-million ton backlog of scrap. On a yearly basis, a 15-percent increase in recovery of automotive scrap could yield an estimated 0.90 million tons per year additional ferrous scrap recovered (based on 6 million autos junked per year). However, recovery of out-of-service automobiles is a complex subject which is dependent upon many factors in addition to freight rates. For example, reducing rail freight rates by $1.66 per ton, or even eliminating all rail transport charges, probably would not achieve 100 percent recycle of automobile hulks. Such savings to the scrap processor would not be enough to warrant delivery of all out-of-the-way junked automobiles to the processor's yard. The amount of unrecovered ferrous scrap represented by auto hulks is relatively small compared with its rate of domestic use and export, which totaled 36.9 million tons in 1969.[125] However, it was reported by the ferrous scrap industry that a recent study has concluded that, "national availability (of ferrous solid waste) indicates a calculated amount approaching 750 million tons."[126] Since the report was not available to the study team at this writing, the present discussion does not reflect the alleged existence of this large scrap backlog.

ICC's attention to the National Environmental Policy Act (NEPA) and its expressed position that environmental matters will be considered in future acts are promising signs. If information indicating rail freight rates hinder the recovery of scrap iron and other secondary materials is developed, the Commission will have the data required for analysis of the problem and effects of alternative actions.

A Supreme Court decision, *Baltimore & O. R. Co. v. United States,* 345 U.S. 146 (1953), paved the way for the ICC to approve freight charges that do not necessarily cover the cost of providing the transportation service:

> As long as rates as a whole afford railroads just compensation for their overall services to the public . . . the fixing of noncompensatory rates for carrying some commodities when the public interest is thereby served (is not barred).[127]

Future studies may indicate that scrap and waste materials would be recycled to a greater extent than at present if transportation charges were altered. If so, ICC is legally empowered to act to effect a reduction in rates below the cost of service in those instances in which rates as a whole are providing overall just compensation and in which such recycling would come within the Court's view of the public interest.

Paper and Timber Freight Rates

No compiled nationwide data were available on movement of waste paper, pulpwood and related commodities. Meaningful data showing whether there is discrimination in shipping charges between secondary paper and its "competing" pulpwood are difficult to develop. The bulk of pulpwood movements are intrastate and/or less than 125 miles, whereas scrap paper and newsprint moves are considerably longer and are most often interstate. The latter moves are usually from urban areas to relatively remote plants. The major discriminatory factor appears to be the fact that longer moves are required to transport waste paper to processing plants than required for pulpwood.

Representative rail rates were obtained from Southern Railway System for movements of pulpwood, pulpboard, scrap paper and newsprint. The rates shown in Table 7 are from straight mileage rate schedules except those for newsprint, which were derived from point-to-point quotations.

On initial examination it appears that the rates for pulpwood are discriminatory against waste paper and pulpboard. However, about 3 lb of pulpwood are required to manufacture 1 lb of paper, whereas 3 lb of scrap paper are used to produce 2 lb of paper. Furthermore, pulpwood is shipped in open rack cars, which are less costly to operate and maintain than general purpose box cars used to ship paper.

TABLE 7
REPRESENTATIVE RAIL RATES*

		Pulpwood‡		Newsprint§		Pulpboard¶	
Miles	Scrap Paper†	Logs	Chips	A#	B**	C††	D‡‡
50	13	6.4	6.4	21	12.5	18	13
100	18	8.6	8.6	26	16.5	22	17
150	22	9.6	10.0	32	19.0	29	20
200	23	11.9	12.2	37	22.0	33	22
250	31	13.3	13.7	42	25.0	36	25
300	32	15.5	15.9	44	26.0	39	29
350	35	16.9	17.4	53	32.0	45	33
400	38	18.9	19.6	57	33.0	48	35
450	40	20.4	21.1	61	36.0	53	37
500	40	22.5	23.4	65	38.0	55	39

* From Southern Railway System, X267-B level, (¢ per cwt).

† Minimum weight, 80,000 lb.

‡ Approximate charge per cwt. Rail rates are quoted on basis of cordage, or cordage equivalent in the case of chips. These cwt approximations are based on the normally accepted average weight per cord for soft woods.

§ Minimum weight, 100,000 lb. This rate excludes unloading allowances of 3½¢/cwt for off-track and 5½¢/cwt for off-track and on-track delivery combined. The applicable allowance should be added to colums A and B to arrive at the complete transportation charge.

¶ Charge for the first 100,000 lb.

# Charge for each 100 lb in excess of 100,000 lb.

** Minimum weight, 120,000 lb in box cars more than 53 ft long.

†† Charge per cwt for first 120,000 lb.

‡‡ Charge per cwt in excess of 120,000 lb.

The cost to ship scrap paper is approximately double the cost to ship pulpwood per cwt; newsprint is about three times as much; and pulpboard is about two and one-half times as much. These differences decrease with distance of the move.

Those figures represent rail rates of one carrier in one section of the country only. Rates can vary dramatically from one section of the country to another and from one situation to another, as discussed above.

Pending ICC Action

Three rulemaking procedures which have a bearing on solid waste recovery with respect to transportation have recently been concluded or are presently under study by the Commission.

Ex Parte No. M.C.-85. Recognizing that transportation is a necessary facet of any successful recycling program, the ICC has approved procedural changes to assist such community activities. Most for-hire motor carriers under the jurisdiction of ICC do not now have authority to haul reclaimed waste products from recycling centers to processing plants. Under standard ICC licensing procedures, motor carriers wishing to obtain this authority are required to submit numerous forms and wait several months for certification. To encourage motor carriers to participate in recycling programs, the ICC instituted special licensing procedures to simplify the filing and certification process. The Commission has taken this action based on a finding of public convenience and necessity considered on a national scale.[128]

Ex Parte No. 55 (Sub-No. 4). In response to the NEPA, the ICC initiated this rulemaking procedure to determine "how this agency can best implement the national environmental policy and meet its statutory obligations."[129] The Commission has stated:

> It is the goal of this proceeding to develop the procedures necessary to implement the national environmental policies expressed in NEPA and related statutes and requirements. We intend to adopt special procedural rules and guidelines which will best enable us to come to grips with those environmental matters which are within our regulatory jurisdiction.[130]

Specifically, the Ex Parte finding requires that a detailed environmental impact statement be prepared when any regulatory action having a significant environmental impact is considered. The form and content of the statement will follow the general guidelines promulgated by the Council on Environmental Quality. In all initial papers filed with the Commission, the filing party must file a statement indicating the presence or absence of any effect of the decision on the quality of the environment. In proceedings that have a significant effect on the environment, all parties must file statements detailed to the fullest extent possible.

Ex Parte No. 55 (Sub-No. 4) was decided on January 14, 1972. Determinations in all proceedings that significantly affect the environment will include an evaluation of environmental factors, as outlined in Section 102 of the NEPA, in conjunction with other economic and technical considerations. The Ex Parte finding is prepared in the broadest of terms, with minimal reference to specific elements to be considered in the statement.

Ex Parte No. 270. Scrap iron and steel processors are among the many shippers who have expressed complaints about the basic rate structure charged by railroads. Because of widespread Congressional and public interest in freight rates, ICC has initiated an investigation into the entire basic rate structure in Ex Parte No. 270.

This Ex Parte proceeding was initiated late in 1970. Interested parties were advised of the proposed investigation and requested to submit their comments. The ICC is evaluating the many responses and has initiated the first procedure, referred to as Sub-No. 1, which is limited to studying transportation aspects at Great Lakes ports.

The other specific topics to be studied have not yet been identified. Only two representations were filed with respect to recyclable solid waste. One was filed by a private individual, and the other by the Institute of Scrap Iron and Steel, Inc. It is impossible to say at this point whether the investigations will encompass the subject of the effect of rates on recyclable and reusable commodities.

Recommendations

- *The ICC should sponsor a thorough study of the effects of freight rates on secondary material recovery and marketability.*

  The present discussion only touches the surface of the issues. There is need for an in-depth investigation of the relationships involved between rates and recycling. An ideal mechanism is available, Ex Parte 270, through which the ICC could support an independent study of the problem. If funds are unavailable for such work, a special request to Congress for support is deemed appropriate, given the importance of the issue in relation to the environment and the national transportation policy. There is not now sufficient information available to definitively state whether freight rates do or do not influence resource recovery activity.

- *The ICC should grant preferential rate increases or rate hold-downs for secondary materials if it is determined through hearings and studies that recovery of such material will increase significantly due to freight rate adjustments.*

  Rates that do not cover the carrier's costs are only permissible when the overall rate structure provides the carriers an adequate rate of return. At present rail carriers are experiencing low earnings in general. Thus, preferential rates for shipment of secondary materials would necessitate rate increases for other commodity classes.

- *Pending resolution of the freight rate/scrap movement question, the ICC should continue to follow the present procedures in determining the suitability of rate and service charge requests.*

CHAPTER VIII

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE

Abstract

The National Bureau of Standards (NBS) represents the public interest in the development of voluntary standards for consumer products. Although NBS is not solely responsible for such standards development, the agency's influence is significant; NBS often assumes a leading role in standards development. Solid waste recovery has been hindered because limited markets exist for the recovered material. One reason given for the poor market condition has been questionable reliability of secondary materials. NBS is one agency in the government that could contribute toward development of standards for secondary materials which could stimulate the market considerably. Other related NBS activities are discussed that could influence solid waste generation and recycling.

Background

As its name implies, NBS is the focal point within the Federal Government where a complete system of physical measurement is maintained against which to gauge and calibrate all instruments and measurement devices. The particular activity related to basic measurement standards is most often associated with NBS work in popular literature. However, NBS has certain responsibilities in relation to consumer product standards that are not as widely recognized. These other responsibilities are investigated in this chapter, and the relationships with solid waste recycling and generation explored.

All NBS activities are carried out within five organizational components as briefly described below.[131]

- *Institute for Basic Standards.* Maintains a complete and consistent system of physical measurement and provides services to assure that accurate and uniform measurements are used throughout the country.
- *Institute for Materials Research.* Investigates improved measuring techniques and properties of well-characterized materials. Relates physical and chemical properties of materials to their behavior.

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- *Institute of Applied Technology.* Provides technical services to promote the use of available technology and to facilitate innovation in industry and government. Cooperates with public and private organizations in developing technological standards and test methods.
- *Center for Radiation Research.* Studies use of radiation in attaining missions of NBS.
- *Center for Computer Sciences and Technology.* Provides support for NBS and other government agencies and studies best uses of computational equipment.

The NBS was established in 1901 as an agency of the Department of Commerce. Most of NBS's activities are carried out at its Gaithersburg, Maryland, facility. Its fiscal year 1972 budget was approximately \$47.5 million.[132]

Each Institute and Center contributes to the development of standards, test methods, and related technologies. Besides developing and maintaining the basic standards used in all measurement, NBS cooperates with private and public associations in developing product standards, building codes, and trade practice procedures. These standards can influence secondary material usage and thereby affect the quantity of solid wastes recovered for use.

Standards Development

Standards are developed in the United States primarily through a private, voluntary system. Standardization and quality control measures are processed through this voluntary system, in which NBS plays an advisory, or, at times, a leadership role. The following list illustrates some of the standards-types that are commonly developed:

- Industrial products
- Consumer goods
- Test methods
- Definitions and symbols for technical quantities
- Safety criteria.

In certain cases, the public need is so great that Congress may act to require development of safety standards. Mandatory standards development is usually spearheaded by NBS, but enforcement is the responsibility of other Federal agencies, such as the Federal Trade Commission. For example, NBS was working on fabric testing procedures so that mandatory standards for fabric flammability could be established, as called for in the Flammable Fabrics Act of 1967.

A primary concern of NBS is the establishment of voluntary standards for items to protect the public interest. To this end, NBS cooperates with consumers, distributors, producers, and others in developing standards for important product parameters. Such organizations as the American National Standards Institute and the American Society for Testing Materials are actively engaged in voluntary standards development. In 1970, NBS was working in direct cooperation with over 1,000 committees to develop voluntary product standards.[133] Since voluntary standards are developed in cooperation with industry, compliance is generally widespread among the affected manufacturers and users.

Voluntary product standards presently exist for various consumer commodity classes, such as those listed below:

- Apparel sizing
- Building products and dimensions
- Electrical equipment
- Hardware
- Household supplies
- Packaging sizes and quantities
- Petroleum products
- Plastics content

Only certain specific items in each commodity class are covered by voluntary standards. For example, under the title "Building Products," voluntary standards exist for the following items, among others:

- Standard stock light-duty 1 3/8- and 1 3/4-in.- thick, flush-type interior steel doors and frames
- Copper conductors for building purposes
- Accoustical material

While review of all voluntary product standards was beyond the scope of this project, a sampling indicated that no restrictions exist that prohibit the use of secondary or reclaimed materials in any product. Where material requirements are delineated, the requirement is that the material be suitable, regardless of its source.

A major portion of the effort in developing a product or trade practice standard is expended in research activities. The research work is sometimes only indirectly related to the ultimate objective of standard establishment. Consequently, the results can have significant spin-off value in other technological fields. For example, although not originally initiated by NBS to solve solid waste problems, certain on-going investigations have possible application in resource recovery efforts, as briefly described below.

Thermal Decomposition of Hydrocarbons,[134] The primary steps of the pyrolytic process are being studied by the Institute for Materials Research to help explain hydrocarbon combustion and the cracking process. It is anticipated that an accumulation of data on the pyrolysis of carbon compounds will be gathered. Since municipal solid waste contains high concentrations of carbon, this study is applicable to the development of a pyrolysis system for recovering the energy value from solid waste.

Quantitative Microscopy.[135] Automatic microscopy techniques are being developed by NBS's Institute of Material Research to aid in determination of the amount, size, shape, and arrangement of particles in metal alloys, ceramics, minerals, and composites. These factors influence material performance characteristics. Such a system for analyzing these features would be beneficial in assessing the suitability of materials containing secondary materials.

NBS was active in two specific areas relative to standards that more directly affect solid waste generation and reuse. These are discussed in the following two sections.

Building Codes

Most structures constructed in this country must be erected in conformance with a local building code. Such codes set forth the minimum acceptable design criteria to assure that buildings are safely constructed. The suitability of construction material is one specific topic delineated in building codes. It has been suggested that restrictions thereunder prohibit or discourage the use of materials reclaimed from solid wastes in construction. The veracity of this allegation and the role of NBS with respect to building code development and use is examined below.

NBS serves as Executive Secretary to the National Conference of States on Building Codes and Standards (NCSBCS). The primary goal of this organization is to foster the development and use of national standards suitable for the advancement of interstate reciprocity of product evaluations. There are now four model codes used in the United States, each differing in certain respects. These are the Southern Standard Building Code, issued by the Southern Building Code Conference; National Building Code, issued by the American Insurance Association; Uniform Building Code, issued by the International Conference of Building Officials; and the Basic Building Code, issued by the Building Officials and Code Administrator International. Most local government entities have adopted one of these codes for use. However, many local agencies add special provisions and delete others from the model code so that, in reality, there are thousands of different building codes in existence. In the process of localization, some standardization features of the model codes, including materials standards, may be subverted.

The four model codes themselves contain few prohibitions against the inclusion of used materials in building construction as long as these materials are determined to be equal in performance to new materials. It has been reported to NBS officials, however, that locally developed or locally modified codes often prohibit use of secondary materials.

Even where local code modifications do not alter the model code material standards features, it has been found that local interpretation of the criteria results in effectively excluding secondary material from use. This is so because there is no reliable means by which to quickly assess the soundness of used material.

NBS interest in building codes presently centers around code restrictions concerning industrialized housing. Local building code variations have hindered efforts of residential building companies to erect low-cost housing using factory production techniques. Standardized sizes, materials, and fabrication techniques are important to assembly line production. Extra effort and cost are incurred by housing companies to design and construct standardized housing so that they conform with various localized codes and can therefore be marketed in a sufficiently large area to realize a profit.

The Department of Housing and Urban Development (HUD) has endorsed industrialized housing construction as an effective means by which to realize the Nation's housing goals. HUD, under its Operation Breakthrough program, has consequently enlisted the aid of NBS to help establish the feasibility of applying the performance concept to the problem of evaluating building innovation, particularly in relation to architectural design features of factory-built housing. NBS, with the support of HUD, is working with NCSBCS to explore this approach as an aid in the economical production of housing. Hopefully, performance standards in the form of *Operation Breakthrough Guide Criteria* will be used to replace the Federal Housing Administration's *Minimum Property Standards* in selected housing projects.

The use of performance standards for construction materials could encourage the use of secondary materials. Regardless of the origin of the material, if its performance characteristics meet certain set minimum criteria, it would be acceptable for use. It is expected that applicability of the performance standards presently under development will initially be limited to factory-type housing. Administration, enforcement, and interpretation problems are too severe to attempt more widespread use by building code jurisdictions at this time. Eventually, NBS hopes that performance standards will be adopted to supplement present materials criteria in building codes.

NBS began studying performance standards for building materials and construction techniques used in industrialized housing in late 1970. Generally useful results are expected in 2 or 3 years. Limited results may be available sooner. Although these performance standards are being developed specifically for use with the HUD Operation Breakthrough program, they could have beneficial effects on resource recovery efforts. Performance requirements of materials will be specified rather than material properties.

NBS is discovering many areas requiring the development of appropriate performance test methods for new materials. They are also finding it difficult to develop tests providing accurate prediction of performance limits for materials and composition of materials. Adding the additional constraint of secondhand materials would not make the undertaking impossible, but it would certainly increase the difficulty. The priorities of NBS do not include development of performance requirements and test methods adaptable to both new and secondary materials.

Packaging

A method of reducing total solid waste generation, especially from municipalities, is to reduce packaging waste quantities. Packaging wastes represent approximately 13.3 percent of the 350 million tons of residential, commercial and industrial solid wastes generated in 1966.[136] NBS has working relationships with most manufacturers of the packaging materials and package users and also administers sections of the Fair Packaging and Labeling

Act (FPLA). However, the FPLA does not give NBS the power to regulate package design. Its authority under the FPLA involves the prevention of "undue proliferation of weights, measures, or quantities."

NBS personnel indicated that some thought had been given to the establishment of voluntary packaging standards wherein use of those materials that are difficult to recycle would be discouraged. Also overpackaged products, that is those commodities with more packaging than necessary to contain the product, would be discouraged. Existing relationships with packaging and packaging material manufacturers would facilitate this work. However, no definite plans to initiate such a standardization program have been proposed.

Other NBS Interests in Solid Waste Matters

In response to the increasing national interest in solid waste management problems, a group of NBS personnel formed an ad hoc study committee to determine how NBS capabilities relate to the problems of solid waste management. Each of the five Institutes and Centers were examined to identify how they could contribute to this effort. The committee produced a report outlining 39 solid waste-oriented projects for which NBS capabilities are suited.[137] Twenty-four proposed projects pertain to solid waste generation and recovery. The descriptions of all 39 projects discussed in Reference 137 are brief and only conceptual in nature. Following are discussions of the more promising proposed projects:

Scrap Tolerance Levels.[138] Currently there are no standards to establish the proper mix of secondary and virgin materials required for an acceptable end product. Manufacturers of such products tend to exclude scrap in their product mix if there is any doubt as to the integrity of the final product. Technical work carried out by NBS could lead to the establishment by others of a tolerance standard for scrap mixed with virgin materials. The existence of such a standard may lead to increased usage of secondary materials in industry.

Processing and Quality Control.[139] It has been estimated that approximately 15 percent of the annual quantity of automotive and similar scrap is strewn about the countryside, accumulated in junk yards, or discarded at disposal sites.[140] Although there are numerous reasons why this scrap is not presently reclaimed, one pertains to scrap quality. If processed scrap quality can be improved and/or assured, an increased demand from consumers (steel mills in the case of scrap iron and steel) should be expected. Accordingly, research conducted by NBS on the effects of impurity (tramp element) build-up on the properties of materials produced could lead to the establishment of processing and quality control standards. Such industries as auto wreckers and scrap processors could utilize these standards, and thereby encourage a greater degree of recycling.

Architects Design Standards.[141] To assure that onsite solid waste storage facilities are adequately designed, development of appropriate architects and builders standards was considered. Solid waste storage facilities are usually given little attention during the design of commercial buildings and large apartment complexes. As a consequence, these facilities are often inadequate, resulting in unsanitary and/or unsightly conditions. Without adequately planned waste storage facilities, waste recovery (if desired) is hampered.

Product Performance Standards.[142] A more complex task that was considered involves the development of product performance standards. According to secondary materials industry representatives, the market for reclaimed materials must be expanded and assured to achieve a significant degree of resource recovery. Because of the widespread feeling that used materials or products composed of used materials are of inferior quality, the market for reclaimed materials is presently limited. In addition, engineering design criteria are based on accurate knowledge of the properties to be used. If such accurate information does not exist, as is often the case with used materials, preparation of sound designs is a difficult endeavor. (See similar discussion in Chapter IV, Federal Trade Commission.)

In many products, however, the presence of secondary materials does not render the product inferior. Standard testing and certification procedures to measure the performance characteristics of consumer products, regardless of the source of the constituent materials, would establish a rational basis of choice between competing products. It is possible that many products manufactured from reclaimed materials are equivalent in performance characteristics to products made from 100 percent virgin materials. The consumer should not make his purchasing decision based on the origin of constituent materials but on certified performance criteria.

Material Recovery Techniques. Through other projects NBS has studied various material properties. The knowledge gained through these studies can be applied in part to the solution of such problems as solid waste classification and subsequent reprocessing. The following examples are illustrative.

- NBS has investigated the properties of fabrics and synthetic materials. Such study is applicable in devising methods whereby textiles, with their increasing synthetic composition, can be reclaimed.

- NBS has conducted many studies of plastics and their properties. The various types of plastics present in municipal solid waste cannot be reused when mixed together. NBS officials feel that methods by which polymer plastics are reduced to monomers would advance plastic reuse technology.

- In conjunction with the ongoing research activities on paper, NBS personnel can work towards development of easily removable inks to facilitate reuse of paper.

- Development of methods for reclaiming rubber in discarded tires and uses for this rubber is also within the capability of NBS, according to officials.

Recommendations

- *NBS should encourage packaging users and manufacturers to minimize the use of unnecessary volumes of packaging and/or materials that are difficult to recycle.*

  NBS has a close working relationship with packaging manufacturers and users. NBS encouragement may be beneficial in effecting a reduction in the packaging component of solid waste. Since packaging comprises nearly 20 percent of all residential and commercial solid waste, a reduction of 20 percent in packaging quantity would represent a 4-percent overall reduction, or 10 million tons per year. If voluntary action leading to volume reductions cannot be attained, consideration could be given to amending the FPLA so that mandatory design restrictions are possible.

- *EPA should guide NBS in developing test methods and performance criteria for secondary materials by establishing priorities on those materials deemed most beneficial for reuse.*

- *Prior to initiating research leading to establishment at performance criteria and test methods for specific materials and commodities, the scope of the required effort should be determined and compared with the potential benefits.*

  In conjunction with its work on building code standardization, NBS could possibly initiate limited efforts to establish testing procedures that can be used to determine the suitability of secondary materials for construction purposes. If such procedures exist, building code stipulations that used materials be "sound" can possibly be met, and thereby the inclusion of secondary materials in building construction increased.

CHAPTER IX

OFFICE OF COMMUNITY DEVELOPMENT

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Abstract

The Office of Community Development (OCD) has been assigned responsibility for the Department of Housing and Urban Development (HUD) programs concerning the urban community. A significant phase of urban redevelopment is the removal of existing structures or parts of structures. The least costly and most widely practiced removal method is simply demolition and disposal. The large quantities of solid wastes generated impose a burden on local disposal facilities during the redevelopment project period. Accordingly HUD was studied to determine how it affects demolition waste generation and how it can encourage beneficial reuse of these waste materials. Certain OCD programs relate to building code enforcement and standardization. To the extent that building codes influence solid waste recycling and utilization, the OCD can be influential in encouraging resource recovery.

Background

Title I of the Housing Act of 1949, as amended, is the basic law authorizing Federal assistance for urban renewal. A series of amendments over the years have broadened the objectives of the original program.[143] In 1965 HUD was established by the Department of Housing and Urban Development Act.

The basic HUD programs administered by OCD can be categorized as model cities, urban renewal, rehabilitation loans and grants, open space land and related programs, community facilities, and planned variations. Urban renewal activities are further subdivided into the following activities:

- Urban Renewal Program
- Neighborhood Development Program
- Code Enforcement
- Demolition Projects
- Interim Assistance

- Neighborhood Renewal Plans
- Feasibility Surveys.[144]

This study of OCD has been limited to the first five of these activities. Neighborhood Renewal Plans are a tool used for study of large or complex urban areas prior to renewal activity. For such areas a preliminary plan is prepared defining the needs and specific programs for implementation. Feasibility Surveys may be authorized when there are questions as to how a contemplated urban renewal project can be executed.[145] Since neither of these involve implementation, there is no direct interface with solid waste generation. Consequently, Neighborhood Renewal Plans and Feasibility Surveys are not discussed further in the report.

As shown below less than one-half of the approved expenditures for urban renewal activities had actually been disbursed since inception of the respective programs.[146]

Activity	Cumulative funding ($ millions) Approved	Disbursed
Urban Renewal Program	$7,619	$3,476
Neighborhood Development Program	1,014	406
Code Enforcement	245	86
Demolition Projects	22	5
Interim Assistance	13	5
Totals	$8,913	$3,978

This indicates that planning activities had been done and funds obligated, but the projects had not yet been fully implemented. Personnel in OCD indicated that annual urban renewal funding approvals during recent years had averaged about $1 billion. Subsequent budgets are anticipated to rise to $1.5 billion or more annually.

In a public or private project, participation by HUD is limited to providing assistance, support, and incentives. Furthermore, HUD controls ongoing renewal work only through the mechanism of approvals; i.e., HUD requires assurances that Federal money and services are properly expended in the public interest prior to approving disbursements of funds. It does not impose authority beyond that point, nor does it accept responsibility for redevelopment and related activities.[147] Actual responsibility for investment, construction, operation, and maintenance of housing and allied programs rests with the direct participants in the projects: State and local government, nonprofit groups, investors, builders, and individuals. HUD assistance is provided in the form of loans, grants, subsidies, insurance, guidelines, and technical advice.

Field operations of HUD are conducted through regional and area offices. There are 10 regional offices and as many as eight area offices in each region. The regional offices are responsible for supervising and coordinating area office activities on a regional basis. The area offices review and process applications, provide field assistance to public bodies, and monitor projects to assure compliance with HUD policies and requirements. Policy, research and development, and other support activities are provided by the headquarters staff in Washington, D.C.

Urban renewal activities supported by OCD programs have been identified as influencing solid waste generation and reuse. The influence relates to demolition of structures and public facilities and disposal of the debris. The OCD requirement that a recipient of HUD funds have adopted a building code also influences solid wastes as these codes often prohibit the use of secondary materials. In addition, overall HUD policy toward the environmental impact of OCD-supported projects also influences solid waste generation and reuse. These influences will be discussed in the following sections.

Demolition of Structures

The OCD provides grant assistance to local planning agencies for urban renewal activities. An important aspect of urban renewal is site preparation. In many cases the designated renewal area is in an older section of a city where poorly-maintained and deteriorating buildings exist. This area must either be selectively cleared of the old buildings or completely cleared before renewal activities begin.

The basic goal of urban renewal activities is to eliminate and/or prevent deterioration and blight in urban areas. In funding these projects OCD weighs factors such as the degree to which the housing supply for low- and moderate-income families will be increased and the potential for employment opportunities in the planned renewal area improved.

Regardless of OCD's commendable priorities and immediate goals, urban renewal activity does generate significant quantities of solid waste materials in the form of demolition debris, street rubble, and old utilities. This material is generally wasted and represents an acute environmental problem as well as a loss in irreplaceable resources.

Urban Renewal Program. The Urban Renewal Program is the largest single program within OCD. Currently highest priority is assigned projects that conserve and upgrade property. In years past, urban renewal generally involved the complete clearance of an area and replacement with new buildings. This technique often changed the character of the area. Now OCD is placing more emphasis on improving existing housing and removing only those buildings that are beyond repair. Thus, the quantity of demolition debris generated by urban renewal projects now should be somewhat less in terms of tons per acre of project area than during earlier years.

To qualify for Federal assistance under this program, an applicant must have a specified number of deficiencies that require action. For example, at least 20 percent of the buildings in the designated urban renewal area must contain one or more building deficiencies and the area itself must contain at least two major environmental deficiencies.[148] Alternatively, more than 50 percent of the buildings must be substandard structurally to a degree requiring clearance.

Urban renewal projects are conducted in two parts: Part I, Survey and Planning and Part II, Loan and Grant. Part I involves a detailed inventory of the renewal area by the Local Planning Agency (LPA) and preparation of a specific plan for renewal. Those structures and facilities requiring removal are identified in the renewal plan. Also, the costs for site clearance are estimated and supported by data on the number and types of buildings and public facilities involved, unit prices for estimating clearance, and the estimated monetary return from salvable materials, including the basis for salvage unit prices.[149] The LPA, a public agency created for the specific purpose of carrying out the urban renewal project, is responsible for all local activities involving the project. After completing the survey and planning activity, the LPA submits its plan to HUD along with an application for the Part II Loan and Grant. After HUD review and subsequent revisions by the LPA, Federal funds are authorized by HUD to implement the approved renewal plan.

Neighborhood Development Program. The Neighborhood Development Program provides for accelerated urban development through rehabilitation executed concurrently with planning. The program is particularly adaptable to areas where the primary purpose of renewal is to conserve and improve existing neighborhoods, rather than to remove and redevelop.[150] A Neighborhood Development Project (NDP) is similar to and is frequently a part of an urban renewal project. The primary difference between the two is the application procedure. A new application must be submitted each year for a neighborhood development project whereas only one application is required for a multiyear urban renewal project.

The Housing and Urban Development Act of 1970 requires that no less than 35 percent of available funds during fiscal years 1970-74 be made available for neighborhood development projects.[151]

Code Enforcement Grant Program. The principal objective of the Code Enforcement Grant Program is to restore stability to neighborhoods by effective building code enforcement. Adequate supporting facilities and services are also to be provided under the program. A code enforcement grant provides assistance for repair and revitalization of property in a deteriorating condition and improving public facilities and services such as streets, curbs and gutters, sidewalks, storm drainage, and utilities.

The program requires a minimum of property acquisition, demolition, and dislocation of people and businesses. It is preventative in nature and designed to arrest blight before extensive rehabilitation and slum clearance become necessary.[152]

Demolition Projects. The primary objective of the Demolition Projects program is to assist communities in removing hazardous structures that constitute a menace to health and safety. Generally, only those structures judged to be beyond repair are removed from the project area under this program. Public facilities are usually not subject to demolition and thus little street rubble is generated.

The total number of structures to be demolished and a listing of building occupancy is required in the project application. In addition, HUD requires that the contract between the LPA and demolition contractor set forth both the total cost of demolition and the net cost, defined as total cost less any salvage value of demolition material.[153] Title to structures to be demolished is vested in the contractor who is selected on the basis of the lowest net cost for the work. He thus must carefully estimate salvage value of usable materials as well as his costs for demolition and disposal of residues.

Interim Assistance. The Housing Act of 1968 authorized the Interim Assistance program to alleviate problems in blighted areas slated to receive comprehensive renewal assistance, but where more immediate public action is required.[154] The program has been commonly applied in emergency situations; e.g., in areas that have experienced riots.

Activities encompassed are similar to those supported under the Demolition Projects program. The grant application requires identification of the number and type of structures to be cleared.

Solid Waste Generation. No definitive information was available that accurately indicates the quantity of demolition and associated debris generated as a result of OCD's programs. A rough estimate can be made, however, based on the available statistics showing total number of structures removed with OCD support.

Table 8 summarizes the number of structures and corresponding dwelling units cleared during the period 1957-69 under the Urban Renewal and the Neighborhood Development Programs.[155] OCD personnel indicated that the Urban Renewal Program was responsible for most of the removals listed in the table. Table 9 shows the cumulative number of structures removed under the other programs, Code Enforcement, Demolition, and Interim Assistance.[156] In recent years, activity under the Demolition Projects program has increased significantly.

Referring to Table 8, it is seen that during the 13-year period, an average of 19,600 structures comprising 32,700 dwelling units were removed each year. Based on an estimated 100 tons of demolition debris per structure, the potential quantity of debris generated from these two programs averaged nearly 2 million tons annually. This quantity approaches 1 percent of the total municipal solid waste loading. If demolition of public facilities within the renewal area are included, an annual average of 2.7 million tons of debris was generated. Demolition activities in recent years under the smaller grant programs could add 1 million tons per year to the total. However, the records of these programs are not complete and it is difficult to interpret the figures to arrive at an average annual generation.

It should be remembered that these estimates are rough approximations based on meager data at best. The figure, 100 tons per structure, was developed with the help of OCD officials who further indicated the extreme approximation involved in making such an estimation.

The above-noted figures do not represent the total generation of all types of demolition solid wastes, but only those generated as a result of OCD-supported projects. At first glance, a figure representing 1 to 2 percent of the total estimated municipal solid waste generation appears relatively insignificant. However, these wastes are generated in concentrated areas and contribute a large additional burden on the locality's solid waste management problems.

In addition, demolition debris represents a significant quantity of resources that are still useful in many cases.

TABLE 8
SUMMARY OF URBAN RENEWAL AND NEIGHBORHOOD DEVELOPMENT PROGRAMS

Fiscal year	Structures removed[155] (number)	Dwelling units removed[155] (number)	Demolition debris (millions of tons) Privately-owned buildings*	Public facilities†	Total
1957	6,378	14,703	0.64	0.23	0.87
1958	7,070	13,841	0.71	0.25	0.96
1959	10,880	21,963	1.09	0.39	1.48
1960	17,367	33,229	1.74	0.62	2.36
1961	23,560	42,909	2.36	0.85	3.21
1962	20,440	36,602	2.04	0.73	2.77
1963	25,615	46,154	2.56	0.91	3.47
1964	19,934	42,521	1.99	0.71	2.70
1965	19,508	26,360	1.95	0.70	2.65
1966	22,638	35,596	2.26	0.81	3.07
1967	25,451	36,656	2.55	0.91	3.46
1968	25,899	39,368	2.59	0.93	3.52
1969	24,467	31,386	2.45	0.88	3.33

* Based on 2 to 2½ story residential buildings with average dimensions of 15 ft by 30 ft by 40 ft, plus 10 percent for larger nonresidential and mixed buildings. Demolition debris, including salvable materials, assumed to equal 10 percent of the building volume.

† Based on the ratio of the acreage of public land to privately-owned land and assuming that half as much demolition debris is produced from clearance of public facilities, such as streets, utilities, etc., as from building demolition.

Demolition Waste Salvage. The degree to which salvage is actually practiced varies from region to region and from project to project. In some locations, certain items within the demolition debris may have value and are therefore recovered. In Washington, D.C., for example, used brick has high value and HUD officials estimated that up to 50 percent of the building debris generated by renewal programs may be salvaged. Salvage is practiced in the

Southwest region of the United States because cheap labor is available and a ready market for reclaimed material exists in Mexico. In other areas, such as the Midwest, few building components are salvaged.

TABLE 9
CUMULATIVE BUILDING DEMOLITION[156]

Period ending	Projects (number)	Structures removed (number)				Dwelling units removed (number)	Demolition debris* (millions of tons)
		Total	Residential	Nonresidential	Mixed		
Code Enforement Program							
6/70	NA	3,203	NA	NA	NA	6,150	0.32
12/69	NA	2,752	2,400	201	151	5,572	0.28
6/69	NA	2,345	2,010	197	138	5,041	0.23
Demolition Grant Program							
6/70	113†‡	17,473	NA	NA	NA	33,801	1.75
12/69	105†	14,577	NA	NA	NA	26,133	1.46
6/69	86†	NA	NA	2,824§	NA	25,942	0.28
6/68	61†	NA	NA	2,617§	NA	17,871	0.26
12/67	47†	NA	NA	1,586§	NA	11,870	0.16
Interim Assistance Program¶							
6/70	118	2,718	2,510	168	40	4,443	0.27
12/69	116	1,553	1,428	96	29	3,064	0.16

* Based on 2 to 2½ story residential buildings, averaging 15 ft by 30 ft by 40 ft plus 10 percent for nonresidential and mixed buildings. Demolition debris, including salvable materials, equals 10 percent of the building volume.

† Excludes about 10 percent of the projects; the number of structures demolished was not reported on those.

‡ Net cost after credit for salvage was $19,318,000.

§ Includes mixed structures.

¶ Program has been in existence only 2 years.

NA—not available.

The demolition contractor will generally not salvage materials from structures unless a ready market for such materials is present. Much of the hardware in demolished buildings of urban renewal areas is old and of little value. The concrete, masonry, and steel structural material is usually too contaminated to warrant extensive salvage efforts (with the exception of used brick). One use for such demolition debris, however, is as a fill material in embankment construction for road and other construction. OCD officials indicated that little demolition wastes are actually used for this purpose unless the materials can be used onsite.

Present regulations require HUD headquarters personnel to coordinate with headquarters personnel in the Federal Highway Administration (FHWA). Additionally, LPA's and HUD Area Offices must coordinate their renewal plans with State and local highway departments. No evidence was found that these relationships resulted in any secondary use of demolition debris for highway construction. Embankments on major highway projects are excellent sites for disposal of inert demolition debris while achieving a beneficial use of the debris. FHWA officials have indicated that a major problem with using inert solid wastes for roadway embankments was the lack of adequate quantities (see Chapter III). LPA officials, on the other hand, often have an excess of inert demolition debris and no readily available disposal method or site. Obviously, effort would be required to coordinate demolition waste disposal with embankment construction for a highway project. However, the difficulty in coordination could be more than offset by the savings in disposal costs.

Assuming one-quarter of the 3 to 4 million tons of demolition debris from urban renewal activities can be economically reclaimed, and one-half requires landfill and/or incinerator disposal because it is organic material or is a mix of organic and inert material, about 1 million tons of solid waste would be available for disposal within highway construction projects. This estimated quantity is about equivalent to the total annual solid waste generation of a city of nearly 1 million, or 0.5 percent of the Nation's municipal solid waste generation.

OCD Policies Regarding Solid Wastes. While an applicant for HUD funds under any of the previously described programs must detail such things as the number and type of structures and public facilities to be cleared, the cost of the project, and the number of people to be affected, there is no requirement for the LPA to estimate the quantities of solid waste to be generated or plan for its disposition. Such estimates could be made relatively easily, because the raw data required to estimate the quantities and types of waste and salvable material generated by clearance activities is included in the renewal plan. Nor is there a requirement or even a suggestion that demolition wastes should be utilized where possible. The lack of such consideration, while deficient from a resource recovery standpoint, has also caused project delays in the past. HUD officials indicated that on several projects neither the demolition contractor nor the LPA had considered solid waste disposal until the project was underway.

OCD has felt that it is the responsibility of the LPA to determine the management of demolition debris. The LPA in turn passes on this responsibility to his demolition contractor. Aside from requiring that the bid cost for demolition reflect the potential salvage value of reclaimed materials, OCD is presently unconcerned about the fate of waste byproducts generated as a result of its activities. Even where demolition can be avoided, regulations discourage the intact removal of buildings in an urban renewal area. For example, the cost of moving buildings intact may be charged to the project only if the buildings are of historic value and will be restored and maintained as such. The LPA may permit building owners or purchasers to relocate buildings to sites outside of the project area, but without reimbursement, and only if such relocation will not result in the creation or extension of blighting conditions in another area.[157] Structures cannot be sold unless the sale is identified within the approved demolition contract and the contract price reflects the value of these structures.[158]

Overall, it appears that the nonexistence of specific OCD policy relating to the solid waste generation and salvage aspects of building demolition has the effect of discouraging reclamation and encouraging generation of demolition debris.

Codes

A municipality must have an approved Workable Program to be eligible for participation in HUD programs. The Workable Program is required to include a system of local codes, such as a housing code, zoning regulations, and building, plumbing, electrical, fire protection, and related codes. The local building codes must be comparable with one of four nationally recognized model codes.[159] The model building codes are considered performance-oriented, to the extent that available test methods for materials will realistically allow. The codes are periodically reviewed and revised to include new materials and methods of construction.

A major problem with existing building codes lies with their enforcement. One HUD official stated his opinion that, "90 percent of the problems with codes have been in enforcement rather than the building code itself." Individual States and cities interpret and modify the codes to suit their own special needs. The National Commission on Urban Problems reported that thousands of local code provisions are often written by or for speculators, builders, and the building trade unions.[160] Pertinent to this study are provisions added by local governnments stipulating that all materials used in construction must be new. This obviously limits use of secondary materials but does facilitate code enforcement and simplify code administration. The primary interest of HUD in regard to building codes lies with minimizing the cost of home construction, rather than to facilitate secondary materials recovery.

Under HUD's Operation Breakthrough program, the National Bureau of Standards (NBS) has been developing performance standards for industrial housing. The performance standards being developed, for the most part, are to be architectural in nature. This is a preliminary step toward expanded use of secondary materials in building construction.

HUD is also working to establish uniformity of the various model codes, under the auspices of the National Conference of States on Building Codes and Standards. Results are not expected for some time, as more than 1 year was required for the various State officials to agree upon a uniform set of definitions. When attempts are made to standardize technical aspects of the codes, even more time delays can be anticipated.

It is doubtful whether a single code will ever be adopted for use throughout the United States. HUD officials indicated a single code would be impractical even if geographical differences in weather, loadings, and other factors could be resolved.

Environmental Impact Considerations

HUD has reacted cautiously to the National Environmental Policy Act of 1969 (NEPA), P.L. 91-190. This act calls for preparation of environmental impact statements for major projects. Following are excerpts from a June 19, 1970, letter to the Council on Environmental Quality (CEQ) from HUD Secretary Romney illustrating HUD's position on NEPA.

> Almost every program that HUD administers relates to the urban environment, and there are literally thousands of project approvals for which environmental statements could be prepared. We plan in the immediate future to concentrate our efforts on programs, handbooks, policy circulars, and controversial or precedent making decisions on projects. It would be infeasible to provide comprehensive coverage in the immediate future, and the incorporation of the policies and goals of P.L. 91-190 into our general decision-making processes and policy documents appears to be the activity which will contribute to environmental goals.[161]
>
> For environmental statements relating to individual projects, HUD will rely on the applications for information and will supplement this by field checks and checks with other Federal agencies as appropriate.[162]

To date, according to OCD personnel, no program handbooks or policy circulars requiring preparation of environmental statements have been issued. The Neighborhood Development Program Handbook is currently being revised, and criteria relating to environmental statements has been included, but this handbook, which is now in draft form for HUD review, will probably not be issued for some time.

Since the June 1970 memorandum, a number of intra-office memoranda have been written and meetings conducted, but no positive action has been taken. On July 16, 1971, new HUD policies designed to implement P.L. 91-190 and CEQ's guidelines for preparation of environmental impact statememts were issued.[163] The memorandum requested each HUD office, including OCD, to issue an office-wide circular with environmental policies, standards, and clearance procedures governing all programs administered. These circulars are to be prepared prior to June 30, 1972. Included in the memorandum are criteria setting forth conditions under which detailed environmental impact statements are to be prepared. On projects involving urban renewal activity at least one of these four conditons must exist:

- The proposed concentration of population, traffic, energy demand, or demand for other public services in the renewal area must approach or exceed a 50-percent increase over pre-renewal conditions.

- The new development is expected to cause increased noise levels, waste products, or waste energy that will exceed the absorption capacity of existing facilities and airsheds in a manner meeting applicable standards.
- The project involves historic structures.
- The plan would entail an increase of 100 ft or more in the height of any structure.

OCD personnel reported that these threshold levels warranting preparation of environmental impact statements were submitted to EPA for review and were subsequently approved. Few, if any, urban renewal projects are expected to require detailed environmental impact statements under these restrictions. For example, HUD policy required that, to be given first priority, urban renewal projects must include 50 percent or more dwelling units for low- and moderate-income families. Thus, population densities are seldom increased significantly over previous conditions. The other three conditions would likely occur only as special cases. If none of the four thresholds are met, a negative statement would be prepared to indicate that the project is "not significant" or does not have an adverse effect on the environment.

A review of HUD guidelines prepared to assist staff personnel in the preparation of impact statements seem related only to possible effects of the completed project. The impact of clearing and construction work during the project was conspicuously absent. The generation, salvage, and/or disposal of this material was apparently not considered an environmental problem by HUD officials.

Recommendations

- *Each LPA, upon applying for Federal funds under OCD's Urban Renewal, Neighborhood Development, Demolition Projects, and/or Interim Assistance programs, should be required to estimate the types and quantities of demolition debris to be generated from clearing operations and to prepare specific alternative plans for disposal of wastes.*

  Early identification of expected quantities of demolition debris during planning phases of a project will better enable the LPA and its contractors to provide for beneficial reuse of these materials. Also, disposal of residual materials can be more effectively planned. In certain situations, it may be desirable to identify specific materials for salvage by the contractor, but this decision must be made on an individual project basis.

- *OCD should increase efforts to coordinate renewal projects with the FHWA and State highway departments to facilitate use of demolition debris in roadway embankments.*

  Present regulations require headquarters personnel in HUD to coordinate with those of the FHWA. Additionally, LPA's and HUD Area Offices must coordinate their renewal plans with State and local highway departments.

- *If detailed environmental impact statements are prepared for HUD-sponsored projects, factors relating to generation, reuse, and disposal of solid wastes should be considered.*

From the standpoint of solid waste management and waste utilization, implementation of the first recommendation can solve the solid waste problem without preparation of detailed environmental impact statements.

CHAPTER X

DEPARTMENT OF DEFENSE

Abstract

Large quantities of goods are purchased, used, and discarded by the vast military establishment administered by the Department of Defense (DOD). A thorough study of all possible DOD influences on solid waste generation and recycling was not feasible under the time constraints of this investigation. Accordingly, only certain aspects of DOD's activities are briefly considered in relation to solid waste generation and resource recovery problems.

- The role of the Defense Supply Agency (DSA) in surplus property management vis-a-vis solid waste generation and recovery.
- The base and headquarters levels of the Department of the Air Force as related to solid waste management.
- The headquarters level office of the Environmental Office of the Deputy Chief of Staff for Logistics, Department of the Army.

Regulations and policies governing excess property reutilization or disposal were found to encourage recovery of materials and inhibit solid waste generation. Improper interpretation and lax enforcement can subvert the system; however, this study was not in sufficient depth to indicate the efficiency of the system.

DOD's purchasing policies and specifications can have significant influence on secondary material utilization. For example, existing specifications may stipulate that items purchased by DOD not be composed of used material. Such influences are the subject of another EPA-sponsored study, and are not dealt with herein.

Background

As originally planned, the study of DOD was to concentrate on the policies and programs relating to solid waste generation at the military installation level. However, this approach was found to be unworkable for several reasons. General policy and regulations were found to be established by headquarters, and only those required for implementation of headquarters directives are developed at the installation. Also, regulations were found to vary from base to base, so a meaningful study of solid waste generation at military installations, per se, would have been impractical within the limited time and resources available.

This report discusses certain activities of the Defense Supply Agency (DSA), the Department of the Air Force, and the Department of the Army in relation to solid waste generation and recovery, and gives a brief background of the DOD. Activities outside the continental United States are not considered.

History, Purpose, and Organization of DOD. DOD was established as an executive department of the Federal Government by the National Security Act amendments of 1949.[164] Its creation was part of a plan for integration of the policies and procedures of the various departments, agencies, and functions of the government concerned with national security.[165] DOD is charged with providing for the security of the United States. The Departments of the Army, Navy, and the Air Force are separate military departments within DOD.

DOD employs approximately 6 million civilian and military personnel to conduct the many activities and support functions designed to further its goal of providing for national security. Its fiscal year 1972 budget was $77.5 billion, representing about 34 percent[166,167] of the budget for Federal Government activities. The DOD budget for material procurement was in excess of $18 billion.[168] There are approximately 450 major military installations in the continental United States and about 3,000 installations worldwide.[169]

Defense Supply Agency (DSA)

DSA was established in 1961 for the purpose of providing supplies and services used in common by the military services. Establishment of DSA was authorized by the Secretary of Defense under provisions of the Property and Administrative Services Act of 1949, as amended. Responsibility for excess and surplus Federal property disposal was assigned to the Administrator of the General Services Administration (GSA). Under the Act, the Secretary of Defense is responsible for management of excess property held by DOD overseas. The Administrator of GSA has since delegated to the Secretary of Defense responsibility for disposition of excess and surplus DOD property within the United States.[170] DSA has been designated by the Secretary of Defense as Administrator of the DOD surplus property disposal program. DSA provides the following services to DOD operating activities:

- Supply support, including procurement, storage, and distribution of items commonly used by both the armed forces and civil offices of DOD. In fiscal year 1970, DSA procurements totaled $4.1 billion, representing nearly 2 million items.[171]

- Logistic support, under such activities as the Materiel Utilization Program, DOD Coordinated Procurement Program, Surplus Property Disposal Program, and Industrial Plant Equipment Reutilization Program.[172]

- Defense contract administration, involving support for the military departments, other DOD components, the National Aeronautics and Space Administration (NASA), other Federal and State agencies, and friendly foreign governments. Value of prime contracts being administered as of June 30, 1970, was approximately $53 billion.[173]

To carry out these programs and activities, DSA had 55,784 employees as of June 30, 1970, most of whom were civilians.[174]

Of all DSA activities, the Defense Logistics Services Center (DLSC) relates most closely to solid waste generation and reuse. DLSC is responsible for personal property cataloguing, material utilization monitoring, and managing the surplus property sales program for DOD. Procurement functions and defense contract administration services of DSA were also excluded because the activities are the subject of another EPA-supported study.

A description of the basic property management system used by DLSC is beneficial in understanding the influence this center has on solid waste generation and utilization. Reference to "property" in this chapter is intended to mean personal property or commodities as distinct from real property.

Property Management. Nearly all nonconsumable personal property purchased by DSA and used by the various activities of DOD is accountable regardless of value. Each military activity has supply or material officers responsible for all accountable property assigned to the activity. The excess property is classified into two main categories:

- *Usable property.* This can be any item suitable for use as is or as a source of usable parts. Jeeps, aircraft, ships, heavy construction equipment, electrical wiring, and radio tubes are typical examples of usable property.

- *Scrap.* These items have value only for their material content. Film, metals, paper, rubber, textiles, food, and oil wastes generated in the normal course of military base operations are examples of scrap.

Certain excess usable military items such as ammunition, fire arms, tanks, combat aircraft, and ships are required by law to be demilitarized and sold as scrap if further use within the military is not planned.

Personal property becomes excess to the military service for many reasons. For example, technological changes may alter equipment design and cause obsolescence of current supplies. Normal use results in wear and breakage.

Life Cycle and Excess Property. In order to minimize new procurements and maximize property usage, DSA has established a system to locate new uses for property declared to be excess by the services. Figure 1 was prepared to illustrate the system DSA uses for disposal of excess property within DOD. The sequence of events described in the figure is for typical materials and varies for certain items.

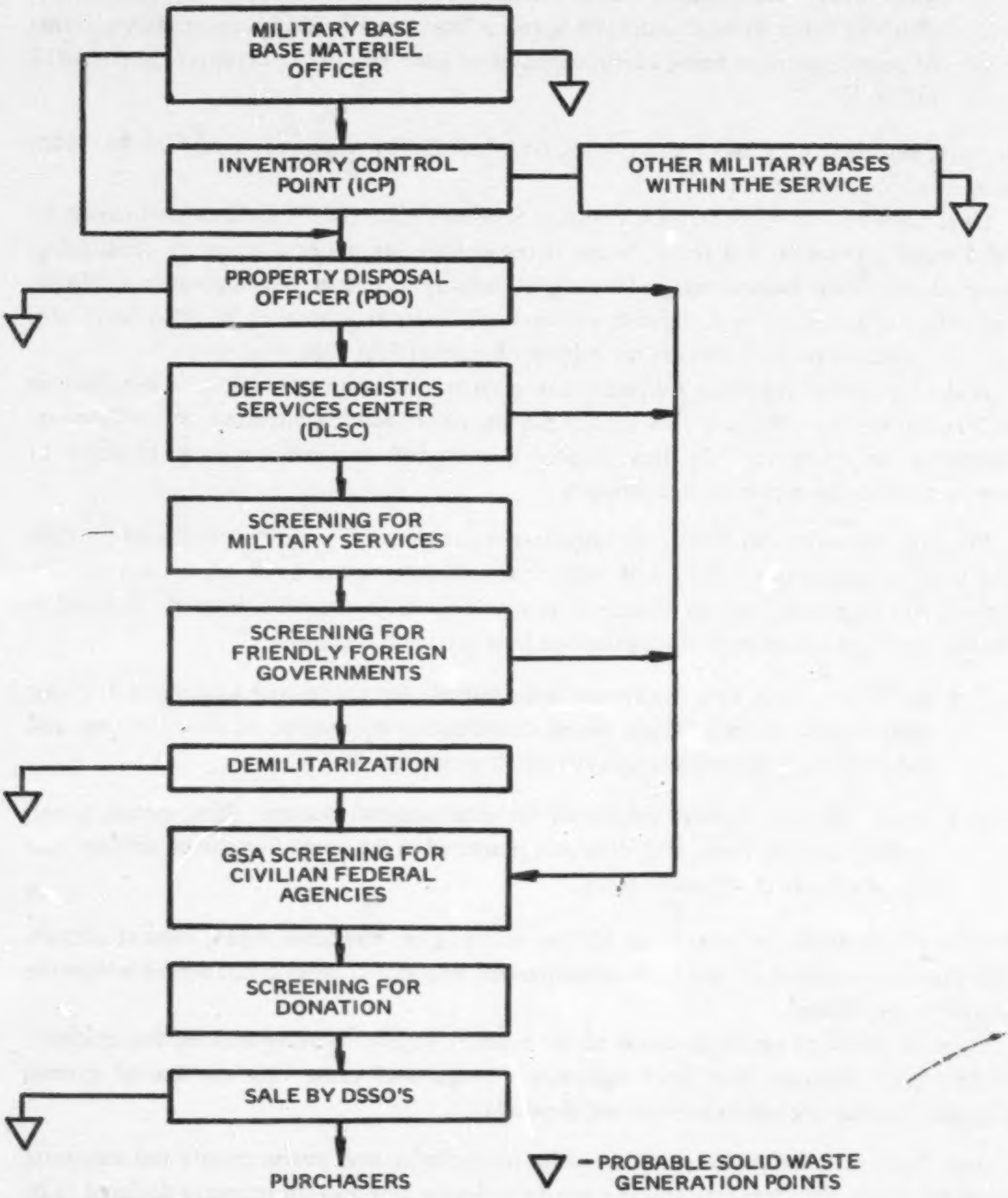

MILITARY BASE BASE MATERIEL OFFICER
INVENTORY CONTROL POINT (ICP)
OTHER MILITARY BASES WITHIN THE SERVICE
PROPERTY DISPOSAL OFFICER (PDO)
DEFENSE LOGISTICS SERVICES CENTER (DLSC)
SCREENING FOR MILITARY SERVICES
SCREENING FOR FRIENDLY FOREIGN GOVERNMENTS
DEMILITARIZATION
GSA SCREENING FOR CIVILIAN FEDERAL AGENCIES
SCREENING FOR DONATION
SALE BY DSSO'S
PURCHASERS
▽ – PROBABLE SOLID WASTE GENERATION POINTS

Figure 1. Schematic flow diagram, system for excess property disposal.

Personal property found to be no longer required by the user is reported to the base supply officer. If the base supply or materiel officer determines that the property is not needed on that military installation, he reports the excess to either the Inventory Control Point (ICP) for the service, or it is turned over to the local representative of the Property Disposal Office (PDO). Items reported to the ICP, such as those of a military nature and items useful to only one service, are either stored for future use within the service or screened for use by other military installations of that service. Intraservice use is given first priority by the ICP. At 6-month intervals, the ICP reviews its supplies in storage and declares unneeded property as excess and releases this property to the PDO.

If the excess property is believed to have a reasonable prospect for utilization, the PDO files a report describing the property with the DLSC. DLSC assigns stock numbers and inputs the information to a computerized inventory system. Concurrently, requests for equipment and materials are received at DLSC from the other services. Requirements are matched against excess property within the computer system. Interservice transfer of excess property is thereby accomplished.

In addition to computerized matching of property needs with excesses, DLSC also distributes weekly listings of excess property to all military installations, defense contractors, and civil agencies. An undetermined amount of excess property, including scrap and some usable property, according to DSA personnel, is not processed through the system because of associated costs and reduced system effectiveness.

Excess property is also screened for use by friendly foreign governments under the Military Assistance Program (MAP). If no demand for the property is found after this step, it is declared DOD excess. Excess property of a military nature is normally demilitarized and the components processed for sale as scrap or as excess spare parts. Some property is undoubtedly disposed as solid waste at this point, but no information was available to indicate its composition or magnitude.

Excess property is next referred to GSA for possible use by civil agencies of the Federal Government. Only after screening by these prospective users is the excess considered surplus to the Government's needs. It is then made available to State agencies, nonprofit organizations, and other eligible donees.

After all screenings, the material remaining is sold. DLSC manages the sale of surplus DOD property in the continental United States through a nationwide chain of 10 sales offices called Defense Surplus Sales Offices (DSSO's). Each DSSO provides a comprehensive merchandizing service for a number of military installations within its area. Many of the sales conducted by DSA involve scrap and other potential waste materials.

Sales. The DLSC of DSA is the primary sales agency for DOD property within the continental United States. DLSC uses a nationwide computerized mailing list of sales prospects to advertise excess property for sale through their DSSO's. The bidder's list is arranged geographically and identifies the commodity interest of over 28,000 prospective buyers. DLSC maintains the Defense Surplus Bidders Control Office as the single point of contact for individuals who are interested in purchasing DOD surplus property.[175]

In an attempt to increase its sales volume and to effect better utilization of excess property, DOD has instituted several scrap processing operations. The Bureau of Mines (BOM) assisted DOD in establishing a scrap processing facility in Ogden, Utah. The primary function of this facility was to separate more valuable nonferrous metals from low-valued metals and other contaminates. BOM personnel indicate the facility works satisfactorily and is cost-effective. However, they also expressed an opinion that further improvement can be achieved. In addition to the Ogden facility, there are reportedly four other scrap processing facilities located in the United States.

A scrapping operation has also been established at Davis Monthan Air Force Base in Arizona. A contractor is furnished with a continuous supply of excess demilitarized aircraft at this facility. Usable components are removed and residual metals sized to be compatible with shipping requirements. This operation was reported to be successful. The operation is thus economical both for DOD and the contractor while achieving resource recovery.

Scrap and other excess property are sold by a number of methods. Selection of the sales method depends on the type and quantity of property to be sold, among other factors. The methods are:

- Sealed bid–for one-time sales and for term contracts
- Spot bid–for one-time sales
- Local spot bid–for one-time sales
- Auction sales, nationwide and local
- Negotiated sales
- Retail sales[176]

DSA personnel report that essentially all excess property offered for sale is sold. Generally, items are first offered on a bid basis. If no acceptable bids are received, it may readvertise. A second bid is often then received that is acceptable. Alternatively, if no acceptable bids are received, the negotiated sale mechanism may be instituted. If a negotiated sale is unsuccessful, the material is disposed as solid waste by the PDO, who generally retains physical custody of the property throughout the utilization screening process. If the property is still located at the originating military installation, the PDO may direct the installation to dispose of it in an acceptable manner.

Table 10 presents a summary of the sales volume conducted by the DSSO's.[177,178] Total proceeds for fiscal year 1970 were $77.1 million, comprised of $43.8 million from sale of usable property and $33.3 million from the sale of scrap. Other scrap wastes include, but are not limited to, such items as glass, rubber, plastics, wood, paper and cardboard, cloth, petroleum (used oil and grease), insulation, leather, and wire. The table does not reflect sales of items outside of the continental United States nor sales by other agencies within or connected to DOD.

TABLE 10

DOMESTIC SALES CONDUCTED BY DEFENSE LOGISTICS SERVICES CENTER, DEFENSE SURPLUS SALES OFFICES*

Description	Acquisition value ($ millions)	Sale quantity (1000 tons)	Gross proceeds		Rate of return (%)
			($ million)	($/ton)	
First half of Fiscal Year 1971[177]					
Usable property	639.4	NA	22.9	NA	3.6
Ferrous scrap	NA	195.0	4.2	21.57	NA
Nonferrous scrap	NA	41.9	10.1	241.99	NA
Other wastes & scrap	NA	111.2	1.8	16.49	NA
Total proceeds	NA	NA	39.0		
Fiscal Year 1970[177] [178]					
Usable Property	975.4	NA	43.8	NA	4.5
Ferrous scrap	NA	335.3	6.7	19.88	NA
Nonferrous scrap	NA	87.9	23.3	265.27	NA
Other wastes & scrap	NA	250.7	3.3	13.14	NA
Total proceeds	NA	NA	77.1		
Fiscal Year 1969[178]					
Usable property	584.5	NA	26.9	NA	NA
Ferrous scrap	NA	365.9	5.4	14.75	NA
Nonferrous scrap	NA	70.3	16.0	227.59	NA
Other wastes & scrap	NA	250.3	2.9	11.58	NA
Total proceeds	NA	NA	51.2		

*Continental United States

Table 11 provides a comprehensive listing of proceeds received by DOD for all excess property sales.[179] Also, applicable DOD expenditures to process these sales are recorded. The figures reflect foreign sales, sales of the Army Ammunition Procurement and Supply Agency, sales of standing timber by the Corps of Engineers, and transactions of other offices within or connected with DOD. It is significant to note that gross proceeds from excess property sales for the first half of fiscal year 1971 were almost $68 million, while the military expended $52 million to process, demilitarize, rehabilitate, and otherwise administer the sales. Thus, cost amounted to 76 percent of the gross proceeds.

DSA personnel expressed confidence in the sales operation, however. The sales program is successful according to these personnel primarily because large quantities of material are generally available at regular intervals. It is DSA policy to seek sale of property unless it has no commercial value, or the estimated cost of continued maintenance, handling, and sale preparation exceeds the estimated sale proceeds.[180] A formula is used to determine if property can be held economically for future sale. The net sale value is equal to (a) - (b + c + d), where:

a = Gross sales value of the property based on historical sales, related experience, and other sources

b = Collection, segregation, and processing costs

c = Other sales preparation and sale costs exclusive of supervisory and administrative overhead

d = Direct sales overhead at 15 percent of c.[181]

When the net sales value is greater than zero, the property is processed for sale. If the net sales value is negative, the negative value will be compared with the estimated cost of disposal by abandonment or destruction. If abandonment or destruction can be accomplished at less cost than the negative sales value, the property will be abandoned or destroyed. If the cost of abandonment or destruction exceeds the negative sales value, the items will be processed for sale even though the net sales value is negative.[182] The abandonment or destruction method must not be detrimental or dangerous to public health or safety.[183]

The PDO may not accept all excess property for processing and sale. For example, scrap materials and other property of questionable value can be rejected if it is not economically feasible for the PDO to process it. DSA personnel indicated that if the PDO accepted all excess items, the cost of processing, handling, and disposing of low-value or unsalable property would exceed returns. Thus, undetermined quantities of possibly usable materials are discarded as solid waste before they reach the processing stage.

Figure 2 illustrates the magnitude of the DOD utilization and disposal programs for the past 6 years.[184] Table 12 is a further breakdown of the utilization and disposal for fiscal years 1969 and 1970.[185] [186] [187] The total reuse activity shown for fiscal year 1970 saved $7.286 billion based on original acquisition value. Approximately 20 percent of the total goods handled was reutilized within DOD, while 5 percent was utilized by Federal civil

TABLE 11

DEPARTMENT OF DEFENSE
GROSS PROCEEDS AND DISPOSAL EXPENSES[179]
FIRST HALF OF FISCAL YEAR 1971

Property type	Proceeds ($ millions)	Cost category	Amount ($ millions)
Usable property	33.718	Administration	11.736
Rate of return (%)	4.1	Receiving-storing shipping	7.740
Scrap			
Ferrous	8.184	Scrap segregation and preparation	2.824
Non ferrous	16.284	Maintenance, equipment & construction	1.711
Other	4.012	Demilitarization	11.921
Combatant ships	1.613	Reclamation	1.864
Lumber & timber*	2.117	Sales	5.396
Other disposals	0.040	Non-identifiable service center	3.287
Reimbursements from transfers	0.014	Lumber & timber*	1.930
Exchange/sale property–DSSO	1.665	Subtotal	48.409
Precious metals–DSSO	0.003	Non-reimbursable military personnel	3.150
Other proceeds†–DSSO	0.187		
Total proceeds	67.837	Total expenses	51.559

* Harvesting of standing timber.

† Including storage and handling charges.

agencies and friendly foreign governments. Three percent was donated to nonprofit organizations, 16 percent sold as usable property, and 50 percent sold as scrap. The remaining 4 percent was abandoned or destroyed or were combat ships.

Solid Waste Generation. The limited time and funds for this study did not allow the in-depth study necessary to define the quantities and types of solid wastes generated by DSA's excess property management system. Information upon which this study is based was obtained from personal interviews and numerous manuals, catalogs, regulations and their revisions. No first-hand observations of the property management system were made to determine where practices and/or policies may unnecessarily result in solid waste generation.

As indicated previously, some low-value excess material is discarded because of expenses involved in processing, handling, and storing. In other cases, scrap and wastes, including rags, used oil, food wastes, lumber, etc., are recycled. Other excess property is likely disposed of because of human error and other imperfections in the system. Unfortunately, no quantitative estimates of the amounts of such solid wastes were available. As far as DSA personnel are concerned, the problem is minimal and all resources are utilized to the extent economically possible.

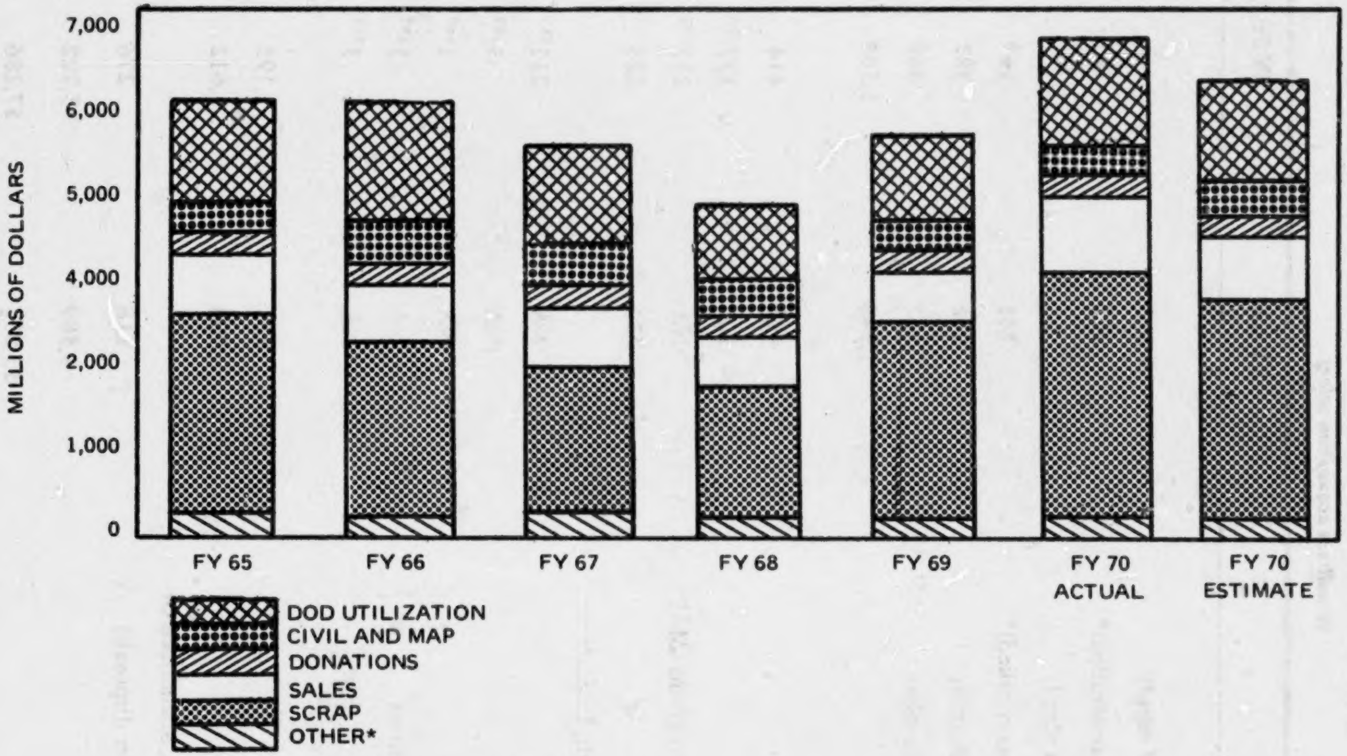
The military office having custody of lost, abandoned, or unclaimed personal property is responsible for trying to find the owner of the property. If the owner cannot be found or if the owner will not claim the property, the property is generally treated as excess government property. However, it can be disposed of only by sale or by abandonment or destruction.[188] It cannot be donated unless the original owner has signed a release document.

Department of the Air Force

A complete study of all services was not possible given the limited scope of this project and the complexity of DOD. Accordingly, Air Force installation activities were selected to serve as an example of service activities with respect to solid waste generation and recovery. There are many specific differences in the types and quantities of wastes generated from service to service, and the policies and regulations promulgated by the services regarding solid waste management vary.

A typical Air Force base is similar in some respects to a small city. Residents live in civilian-type dwelling units and in barracks. Military operations on the base are somewhat comparable to civilian industrial establishments. The solid wastes generated are representative of municipal solid wastes and all types of industrial solid wastes to be expected from a city.

The problems related to municipal solid waste generation and reclamation on Air Force bases are generally similar to those encountered in a city. On the other hand, industrial solid waste generation and reclamation are more closely controlled on military bases because a single manager, the base commander, is responsible for all base activities. Because many items used by the military are accountable, as discussed in the preceding section, it can be expected that unnecessary solid waste generation is minimized.



*Includes abandoned or destroyed, and combatant ships (combatant ship sales for FY 68, 69, and 70 only).

Figure 2. Department of Defense utilization and disposal programs.[194]

TABLE 12

TOTAL UTILIZATION AND DISPOSAL OF EXCESS AND SURPLUS PERSONAL PROPERTY[185]

($ millions acquisition value)

	FY 69	FY 70
DOD utilization		
Interservice transfer of supply System stocks (ICP-controlled)*	202	173
Intraservice transfer of supply System stocks (ICP-controlled)*	141	142
Interservice excess utilization	268	381
Intraservice excess utilization	637	868
Subtotal	1,248	1,564
DOD disposal		
Transfers	450	414
Civil agencies	NA	177[186]
Military Assistance Programs (MAP)	NA	237[186]
Donations	232	225
Department of Health, Education and Welfare	NA	211[187]
Public airports	NA	5[187]
Public buildings	NA	1[187]
Service education centers	NA	5[187]
Other	NA	3[187]
Sales		
Usable property	791	1,195
Scrap	2,998	3,612
Other (combat ships, abandoned or destroyed, and other disposals)	118	276
Subtotal*	4,589	5,722
TOTAL*	$5,837	$7,286

*Excludes PURA referrals.

Due to the limited project scope, there was insufficient time for an adequate review of all base regulations and practices that influence solid waste generation and/or recovery. Therefore, certain example situations are examined as they existed at an Air Force base located in Virginia. This base contained family housing, commissaries, shops, aircraft hangars, and maintenance quarters. Nearly 10,500 people lived on the base, and 10,000 civilian and military personnel were employed.

The following examples are illustrative of practices and policies in relation to the generation and reuse of garbage, cardboard, oily wastes, and metallic wastes.

Garbage. In past years, food wastes were collected by a Navy-monitored contractor who distributed the garbage to hog farmers. When the State law was enacted requiring food wastes to be cooked before feeding, interest in sales of garbage decreased. Thus, there was a need to determine an alternative method of disposal. Monthly accumulation of garbage was estimated at about 312 compacted cu yds.[189] An investigation was initiated by the Deputy Base Civil Engineer to determine alternate methods for processing and disposing of the garbage. About the same time, most Federal activities in the area entered into an area-wide contract for the collection and disposal of wastes. Since the garbage no longer had a buyer, it was included in the area-wide contract and is now being discarded with other solid wastes.

Cardboard. Approximately 2 years ago a base representative and the refuse collection contractor reportedly investigated the feasibility of installing a stationary compactor at the commissary to facilitate cardboard box processing for sale. At the time, the collector was servicing three 8-cu-yd bins, four or five times each day, for a total volume of 500 cu yd weekly of uncompacted corrugated material. However, an economic evaluation indicated that burning would be a less costly solution than compaction and sale.[190] Accordingly, an incinerator was constructed.

Oily Waste. The refuse collector contractor has been required to collect waste oil, solvents, and other petroleum products. When observed, there were 250 barrels of oily waste stored in Government-owned 55-gal drums at the landfill awaiting disposition by the Air Force. The contents (type of oily waste, source, whether or not the oil wastes were mixed) of the barrels were not known exactly. The oily waste can be sold for recycling as long as the Air Force is assured that its subsequent use will not create a pollution hazard, but no buyers had offered to buy this lot.

The Air Force has now issued a policy letter that requires segregation of oily wastes in order to enhance its marketability.

Oily wastes are disposed of only after all attempts to market it for reuse fail, and even then, the Air Force must be assured that disposal of the waste oil will not cause pollution. The base representatives noted that the Judge Advocate General had ruled against the donation of such material, although such donation could result in useful application of the waste. For instance, several individuals and private companies had successfully attempted to secure the oil for use in road dust control.

Metallic Scrap. In an effort to recover scrap metals, the Air Force base provides separate refuse and scrap storage bins at strategic locations. One bin is marked, "metallic scrap" and a second bin, "refuse." The collection contractor collects the refuse for disposal. Air Force personnel collect the scrap for salvage. However, base personnel do not always segregate metallic wastes from ordinary refuse for various reasons, including lack of interest or concern and lax enforcement by supervisors. At the time of inspection, the refuse bins contained approximately 10 percent metals, and the metallic scrap bins contained upwards of 50 percent nonmetals (volume estimates).

Thus, resource recovery was adversely affected, not by regulations or policies, but by employee attitudes.

Other. Another example of positive steps being taken by the Air Force is its pilot program to recycle paper, glass, and metal at 14 Air Force bases.[191] The purpose of the program is to determine the effectiveness and inherent problems associated with recycling.

From these examples it can be seen that resource recovery aspects of solid waste generation are frequently considered by the Air Force. However, positive action does not always result. Even when formal steps are taken to encourage reclamation of valuable resources, such as the installation of separate storage bins, cooperation of personnel cannot be guaranteed.

In some cases, regulations and/or operating procedures preclude the beneficial use of waste material, as in the case of the waste oil. When these procedures result in uneconomical use of property, changes have been effected that often lead to increased resource recovery and/or decreased solid waste generation. For example, prior to 1968, Air Force regulations directed that broken items that could not be repaired at the base level should be returned to special repair depots. The base could scrap the items if they were judged to be beyond repair or if the repair costs were estimated to be in excess of 65 percent of replacement costs.

In a study by the General Accounting Office (GAO), it was found that $6.7 million worth of supplies were scrapped under the latter condition in 1967. However, in a sampling of 78 discarded items, GAO found that 51 (or 65 percent) could have been readily repaired for much less than 65 percent of the replacement cost. The items were scrapped because inexperienced personnel could not accurately assess the repair costs, and it was an inconvenience to report the items for repair. No measure of the weight or volume of material unnecessarily discarded as a result of this action is available, but the dollar value is significant.

Department of the Army

The activities of the Army with respect to solid waste generation and recycling are only briefly explored. Of particular interest are studies entitled, "Cost Reduction, Individual Savings Programs." These describe the ways in which revised operations methods and practices reduce overall costs. As a secondary result, these revisions also may influence solid waste generation and recycling. Examples of "Cost Reduction Individual Savings Programs" reports reviewed are as follows:

- Retreading tires rather than replacing with new tires. It estimated that 75 percent of the tires used by the Army could be retreaded and thereby diverted from disposal as solid waste.

- Reclamation of power shafts having excessive bearing area wear pitting by institution of a new repair procedure.

- Renovation of defective components. Components screened out of a block assembly line due to defects were formerly scrapped. Using modified assembly line procedures, the defective components are screened out of the line, renovated, and used again in the assembly line.

- Reuse of damaged crankcases. Instead of scrapping nicked, penetrated, and otherwise damaged engine crankcases, 75 percent are now repaired and reused.

There are undoubtedly many other examples of past actions in the Army and other services that have improved resource utilization and decreased solid waste generation. There are possibly other procedures and activities that are detrimental in relation to resource recovery goals.

Recommendations

- *Excess and unclaimed personal property should be eligible for donation, if such donation results in the use of the property rather than disposal as solid waste.*

  At present, Federal law prohibits the donation of unclaimed personal property and unsold excess items unless these items are processed through proper channels. Frequently property of marginal monetary value does not warrant screening and is discarded as solid waste. The Federal Property Act should be amended to allow such property to be donated to local organizations, individuals, or private companies when such donation would result in recovery or reuse of the property.

- *A more extensive investigation of DOD regulations and policies that affect solid waste generation and reclamation is needed.*

  Under the scope of the present study, only the surface of the problem could be explored. There are indications that other situations exist in which solid wastes are needlessly generated and resources are not recovered because of outdated policies and/or lax attitudes of personnel. It is recommended that the EPA sponsor more in-depth investigation. The study should include coverage of the following topics:

  - An input-output system analysis of selected personal property items to determine where accountable material is consumed, lost, broken, scrapped, and/or wasted.

- Documentation of the quantities of materials purchased, consumed, lost, scrapped, and discarded to indicate where policy changes can most effectively be made.
- Motivational analysis of DOD employees and military personnel to determine how human-dependent resource recovery techniques can be structured to function most effectively.

CHAPTER XI

UNITED STATES POSTAL SERVICE

Abstract

The United States Postal Service (USPS) was created by the Postal Reorganization Act of 1970. In fiscal year 1970, mail deliveries in the United States totalled 6.64 million tons, or approximately 65 lb per person. Third class mail, widely termed "junk mail", comprised nearly 19 percent by volume and 9 percent by weight of the total mail handled by the USPS. The effects of historical postal rate increases on volume of third class mail were investigated and found to be minimal.

Background

The USPS became an independent agency of the government under the Postal Reorganization Act of 1970, replacing the Post Office Department. The main purpose of the USPS is to provide the Nation with an efficient and reliable mail delivery service. The USPS is headed by a Board of Governors, including the Postmaster General. Administration and finance responsibilities are under the direction of the Senior Assistant Postmaster General for Support, who reports directly to the Deputy Postmaster General.

The total budget for the USPS in fiscal year 1971 was $9.23 billion. Of this figure, $6.80 billion was received in payment for postage and related charges. The projected figures for fiscal year 1972 at the rates now in effect are $10.01 billion and $7.88 billion, respectively.[192]

In fiscal year 1970, mail deliveries in the United States totalled 6.64 million tons, or approximately 65 lb per person. Assuming all mail is eventually discarded, and that the average person generates 5.3 lb of solid waste daily, mail represents about 3 percent of the total municipal solid waste generated. The USPS was studied to determine the extent to which this agency can cause a reduction in that portion of solid waste generation originating from delivered mail.

Theoretically, as postage rates are increased, a decrease in the use of the mails should result. Thus, postage rate increases are one means by which the USPS may effect a reduction in the total quantity of mail entering the solid waste stream.

There are other mechanisms the USPS could use to influence solid waste generation, such as establishment of packaging requirements for fourth class mail that would minimize packaging material quantity, and letter size and weight criteria that would minimize total weight processed. However, this investigation was limited to postage rates and their effects on solid waste generation. Therefore, only those USPS activities relating to administration and finance are discussed; operations pertaining to marketing, mail processing, or building and vehicle management were not investigated.

In 1879, a classification system was instituted for domestic mail to facilitate mail handling and future planning. This has evolved into the present system consisting of four main classes of mail:

- First class
- Second class
- Third class
- Fourth class (including parcel post).

Each main class is further subdivided into subclasses according to such criteria as weight, intended mode of transportation, and degree of presorting by the mailer.

Third class mail has been thought to be a greater source of solid waste than the other classes. In fact, third class mail has been widely termed "junk mail." Other classes of mail, such as personal correspondence, (first class and airmail), periodicals and newspapers (second class) and packages (fourth class), are generally welcomed by the public. A volume reduction in these mail classes could cause reduced solid waste generation, but at the expense of a service valued by the public. On the other hand, third class mail is apparently not as highly regarded by the public and a reduction in this type of mail would likely be welcomed. Therefore, this study concentrated on possible influences the USPS could exert that would result in reduced volumes of third class mail.

Third Class Mail

Third class mail consists of form letters, certain merchandise, books, catalogs, and other printed matter not exceeding 16 oz in weight per piece. The third class rate is generally lower in cost than first class and provides an economical means for an advertiser to reach a large audience. The major subclasses of third class mail are listed in Table 13 along with the respective volumes and weights processed by USPS in fiscal year 1970.[193] Bulk rate regular mail was the largest subclass of third class mail, accounting for over 75 percent of all third class mail. Bulk rate circular mail comprises nearly 19 percent by volume and 9 percent by weight of all mail handled. Bulk rate circular mail is almost exclusively used for direct mail advertising purposes. Rates for each subclass can be on a per piece or per unit of weight basis and vary depending on the subclass.

TABLE 13
THIRD CLASS MAIL VOLUMES
(All figures in billions)

Subclass	Number of pieces	Weight (lb)
Single piece rate	0.952	0.267
Bulk rate-regular, total	15.050	1.573
Printed matter, circulars, form letters, etc.	12.210	1.031
Books and catalogs	2.840	0.542
Bulk rate–nonprofit, total	3.971	0.191
Printed matter	3.562	0.155
Books and catalogs	0.409	0.036
Total, third class	19.974	2.032

History of Volumes and Rates

The Post Office Department began compiling statistical data on quantity of mail handled by class in 1926. Figure 3 illustrates graphically the increase in third class mail volume, both in number of pieces and total weight, from 1926 to the projected 1972 volume.[194] The vertical lines on the curve indicate years in which postal rate increases were initiated. Table 14 shows the record of minimum charges per piece levied on bulk-rate mail from 1952 to 1969.[195]

After the postal rate increase of 1958, the Department of Commerce conducted a study to determine the overall economic effects of third class bulk mail rate increases.[196] In addition to studying the rate increase effects on all business and on printers and letter shop industries, the specific effects on the bulk mailing industry were investigated. The study presented the following conclusions:

- Commercial and business firms constituted the most important segment of third class mail users, representing: (1) 66 percent of all third class users; (2) originating 89 percent of all third class mail pieces; and (3) paying 91 percent of all charges for third class mail.

- Over 90 percent of the surveyed third class mail users reported that the rate increase had little or no influence on their marketing practices. Five percent said that the increases caused a reduction in mailings. Of those firms reporting the degree of dependence on third class mail advertising for their gross receipts, 62 percent indicated this dependence was less than 10 percent. After the 1958 rate increase, the

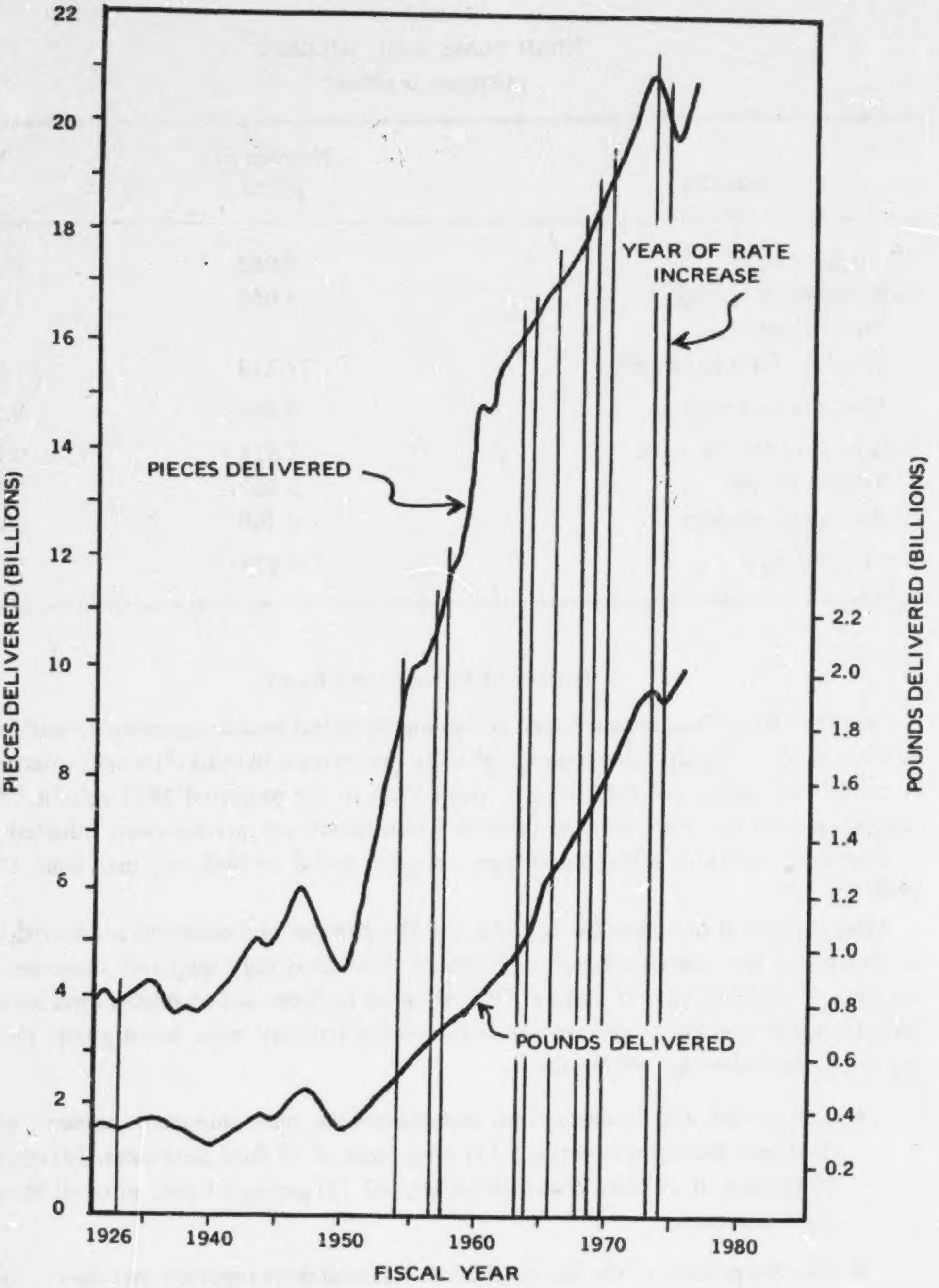


Figure 3. Volume of third class mail.

number of third class pieces mailed by this group increased 7 percent. Third class mailings of the group indicating a greater than 10-percent dependence decreased only 2 percent.

The Department of Commerce study further found that postage accounted for a relatively small part of expenditures by all business. Bulk mail postage expenditures in the surveyed firms averaged $0.43 per $1000 gross receipts after the 1958 rate increase, compared with $0.38 per $1000 before. Notable exceptions were the publishing houses, mail-order and direct selling businesses, and correspondence and vocational schools. Their bulk rate postage costs ranged from $6.38 to $58.13 per $1000 of gross revenue. These businesses make up less than 4 percent of all third class mail users.[197] Referring to Figure 3, it can be seen that the 1958 increase in third class mail rates did not decrease the volume of third class mailings.

TABLE 14
MINIMUM CHARGES FOR SELECTED SUBCLASSES OF THIRD CLASS MAIL[195]

	Subclass	
Fiscal year	Bulk per piece (cents)	Single piece, first 2 oz. (cents)
1952	1.000	2.000
1953	1.500	2.000
1958	1.500	3.000
1959	2.000	3.000
1961	2.500	3.000
1963	2.625	4.000
1964	2.750	4.000
1965	2.875	4.000
1968	3.600	6.000
1969	4.000	6.000

Unfortunately, the Department of Commerce study was undertaken after a relatively minor rate increase affecting the single piece third class mailings only. As shown on Table 13, this subclass accounts for less than 1 billion pieces of third class mail annually compared with the almost 20 billion total. Examination of Figure 3 shows that past variations in the third class mail volumes have occurred independently of rate increases. For example, in 1942 and 1956 third class mail volume (per piece basis) declined, yet no rate increases had recently been instituted. It can be assumed the 1942 volume reductions resulted from wartime conditions. However, no significant outside influence is connected with the 1956 decline. Of the 12 rate increases since 1926, the volume of mailing declined during the year of the increase on only three occasions (1927, 1967, and 1968). Following the rate increases of 1952, 1960, and 1969, the rate of increase in third class mail volume slowed.

A comparison of the percentage increase in bulk regular mailing rates during the 1949-69 period was made with the purchasing value of the dollar for the same period. During the period, the dollar's value declined about 42 percent while bulk mailing rates (per pound and per piece) increased 57 percent and 300 percent, respectively. Thus, users of third class mail service are increasing this use while paying more in terms of real dollars for the service received. Apparently, past third class mail rate increases have not been of sufficient magnitude to cause the demand for this service to decrease.

USPS Postage Rates, Mail Volumes, and Solid Waste

A detailed study of the demand for third class mail and related economics would be required to ascertain the magnitude of rate increases necessary to cause a given reduction in third class mail volumes. Past information is inconclusive, but it is expected that rate increases would have to be substantially larger than past increases to significantly affect third class mail volume.

Postal Service officials have expressed the opinion that sufficiently large rate increases in any or all classes of mailings would decrease the volume of mail delivered. It is likely that businesses would increase their utilization of private mail delivery firms if USPS rate increases were greatly increased. Use of the mail rate structure to stimulate or otherwise affect segments of the economy not directly related to USPS operations is presently practiced. For example, nonprofit organizations pay lower postage rates than profit-making organizations. Educational, religious, agricultural, and veterans publications receive preferential rate consideration to encourage their dissemination and use. So, there is precedence for setting mail rates to influence certain activities, much as tax laws are now used to stimulate specific endeavors. However, USPS officials indicated that the USPS would not likely raise postage rates for the purpose of reducing solid waste generation. A discussion of the basis for this position follows.

USPS Position Basis

The USPS is not a profitmaking organization; however, it considers itself a business enterprise. This agency is in existence to provide a needed service. Postage rates are intended to cover costs only. The predecessor to USPS, the Post Office Department, operated at a deficit of approximately $1.51 billion in fiscal year 1970; that is, the costs of providing postal service exceeded by this amount the charges made to customers for services.[198] It was apparent, therefore, that postal rates must be increased if the USPS was to begin operating at the break-even point.

The Statute creating the USPS requires that revenues from rates and reimbursements plus specified appropriations must equal the total costs of operating the Postal Service. To attain this goal, the USPS has planned a series of rate increases for all classes of mail over the next 5- to 10-year period. Ultimately, the rates in effect for each class will generate sufficient revenue to at least cover its attributable costs and make a reasonable contribution to institutional costs. Institutional costs are those for common mail processing and handling steps applicable to all classes of mail, while attributable costs reflect the direct costs applicable to the particular class of mail. Table 15 shows the present and projected attributable costs and revenues for selected classes of mail.[199]

TABLE 15

SUMMARY OF ESTIMATED FISCAL YEAR 1972 FINANCES[199]

(All dollar figures in millions)

		Revenue from current rates		Revenue from proposed full rates	
Mail class	Projected costs ($)	Revenues ($)	Percent of attributable costs (%)	Revenues ($)	Percent of attributable costs (%)
First	$2,357	$3,517	149	$4,691	199
Second					
Nonprofit	55	13	23	55	100
Regular	238	135	57	328	138
Other	37	15	41	38	102
Total	330	163	49	421	128
Third					
Single piece	101	108	107	180	178
Bulk-regular	416	674	162	864	208
Bulk-nonprofit	106	82	77	106	100
Total	623	864	139	1,150	184

From Table 15 it can be seen that third class mail, at the proposed full rate levels, will generate twice as much revenue as the attributable direct costs to handle it. USPS officials have expressed the opinion that they would not institute higher rates for third class mail even though a reduction in solid waste generation might result. They do not want to lose the 'profitable' third class bulk rate mail business to competitors such as private delivery services, periodical advertising, and television.

Recommendations

- *The use of increased postal rates to control the volume of mail discarded in municipal wastes cannot be recommended based on the limited information available for this study.*

Further analysis could possibly better define the relationship between postal rate increases and mail volume delivered. If such future analysis should indicate that beneficial reductions in solid waste generation would occur if increased postal rates were imposed, there is a strong likelihood that private delivery and mail services would become more cost competitive for the advertising mail market. In that case, government actions would have no net influence in reducing solid waste generation.

CHAPTER XII

PROPERTY MANAGEMENT AND DISPOSAL SERVICE
AND
PUBLIC BUILDING SERVICE,
GENERAL SERVICES ADMINISTRATION

Abstract

Activities of the Property Management and Disposal Service (PMDS) and Public Building Service (PBS), both part of the General Services Administration (GSA), can influence solid waste generation and recycling efforts in various ways. For example, PMDS has responsibility for personal property management within the civilian sector of the Federal Government. In this capacity, PMDS determines the fate of excess property and ultimately arranges for its disposition as either waste or salvable materials for sale. PBS has responsibility for the design and maintenance of Federal buildings. Since solid wastes frequently require preparation and processing before recovery and sale for reutilization, PBS can account for such processing needs in both building design and maintenance practices. PBS and PMDS are discussed in a single chapter because their activities concerning solid waste are related, and they are both subagencies of GSA.

Background

GSA has recently been active in efforts to encourage resource recovery through alterations in purchasing policies. Thus, the Federal Supply Service has begun a review of product specifications to determine those specifications that are biased against secondary material usage. Less publicity has been afforded the actual and potential influences of PMDS and PBS on solid waste generation and resource recovery.

History and Organization of GSA. GSA was established in 1949 by the Federal Property and Administrative Services Act to provide the Federal Government with a centralized system for such activities as property procurement and management. With the creation of PMDS in 1966, the present organizational structure was formed as described below.

Federal Supply Service (FSS). This GSA activity has responsibility to procure personal property commonly used by all Federal agencies. FSS promulgates the Federal specifications and standards for personal property purchases and stores and distributes those commodities purchased. The fiscal year 1972 budget for the FSS was $86 million.[200] The budget amount does not include the cost of procurements made for other agencies.

Federal specifications used by the FSS for purchases can have a marked impact on usage of reclaimed material. However, the effects of Federal purchasing policies on solid waste generation and reuse are not discussed herein. This topic is the subject of another study now being undertaken by EPA.

Transportation and Communication Service (TCS). The TCS has responsibility to provide motor equipment, public utilities, and communications for civilian agencies of the Federal Government. The fiscal year 1972 budget for the TCS was $7.1 million.[201] Possible relationships between TCS duties and solid wastes were not investigated during this study.

National Archives and Records Service (NARS). As the name implies, NARS has responsibility for managing and storing Federal records.[202] As dated records are systematically discarded, solid wastes are generated, but PBS and PMDS have jurisdiction over these problems. NARS had a $27.7 million budget in fiscal year 1972.[203] NARS relationships with solid waste generation or recycling were not studied.

Property Management and Disposal Service (PMDS). In addition to previously stated duties, PMDS has responsibility for management of materials stockpiled for use in national emergencies and disposal of excess materials no longer required. It also identifies excess Federally owned real property, screens the property (offering it to other Federal agencies for use), and disposes of excess property by sales or donation. The budget for PMDS activities in fiscal year 1972 is $39.3 million.[204]

Public Building Service (PBS). As briefly described above, PBS has responsibility for the design, construction, and management of Federally owned and leased buildings. The acquisition, utilization, and custody of all GSA owned real property is also the responsibility of PBS. PBS had a budget of $700.9 million for fiscal year 1972.[205]

Building material and architectural design standards promulgated by PBS that could influence secondary material usage will not be discussed herein. This topic was beyond the scope of this study and is the subject of an investigation covering Federal procurement policies as previously noted.

PMDS Activities in Relation to Solid Waste

The PMDS strives to maximize utilization and minimize new procurements of personal property by the Federal Government. A property accounting and screening system has evolved to facilitate attainment of this goal. The 1949 Property Management Regulations required all agencies (except the Maritime Administration, the Atomic Energy Commission, and the Postal Service) to account for personal property and report all excess property to PMDS. Each civil agency has a Board of Survey that periodically reviews internal property management. This Board was empowered to relieve accountability if property was declared lost, broken, or otherwise unusable. Repairable items are repaired by agency personnel or by private contractors.

Figure 4 illustrates the life history of common use commodities purchased, used, and declared excess by the operating Federal civil agencies.[206] The FSS acts as the purchasing agent for all items used in common by civil and military agencies. In fiscal year 1970, FSS purchased in excess of $2 billion worth of 49,000 different commodities.[207]

As indicated above, the Property Management Regulations direct the Administrator of GSA to account for Federally owned personal property. To more efficiently administer these responsibilities, tthe Administrator has delegated the accounting responsibility for personal property used by the military to the Secretary of the Department of Defense, as discussed in Chapter X. GSA maintains overall responsibility and still administers the transfer and donation of excess personal property from both civil and military agencies, as indicated in the following sections.

Excess Property Management. When personal property in the possession of a Federal civilian agency becomes excess to that agency's needs, it is reported to PMDS. While the property remains in the possession of the reporting agency, PMDS conducts a systematic search of other agencies to determine if a need for the property exists elsewhere. The military services are given first opportunity to request the excess items. Civilian agencies are canvassed next if the military has no use for the items. In fiscal year 1970 commodities with an original acquisition cost totaling $635 million were transferred from one Federal agency to another.[208] Included in this figure was $177 million worth of military property that was handled through PMDS facilities.[209]

Items for which no demand exists within the Federal Government are made available for donation. PMDS has been authorized to donate excess Federal property to the following types of organizations:

- Educational, public health, and civil defense
- Public airports
- Public bodies
- Organizations of educational interest to the armed services.

Thus, school systems, universities, the Red Cross, the Boy Scouts and Girl Scouts, and Boys Clubs, among others, are eligible to receive excess Federal property. The Department of Health, Education, and Welfare and each State assist PMDS in identifying eligible organizations needing excess property. In fiscal year 1970, PMDS donated Federal property worth $361 million (original acquisition cost) to qualified organizations, [210] including $225 million worth of property derived from military activities.[211]

Personal property from civil agencies not transferred or donated are subject to public sale through the PMDS Sales Division. Items sold are classified either as excess usable property or scrap. Examples of items sold are automobiles. aircraft, hardware, office supplies, and drugs. The property is sold by competitive bid and offered on an "as is," "where is" basis. Potential foreign and domestic buyers are encouraged to participate in excess property sales.

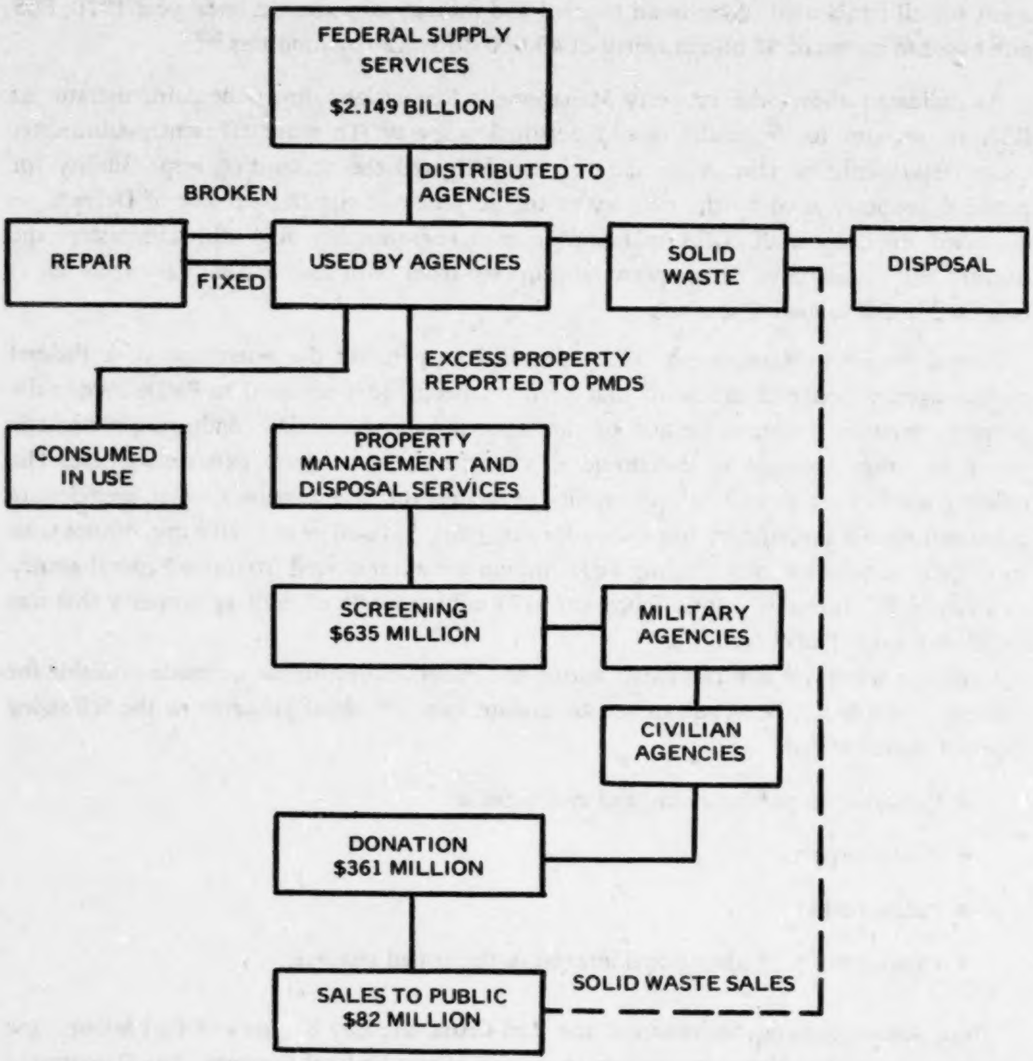

FEDERAL SUPPLY SERVICES
$2.149 BILLION
DISTRIBUTED TO AGENCIES
BROKEN
REPAIR
FIXED
USED BY AGENCIES
SOLID WASTE
DISPOSAL
EXCESS PROPERTY REPORTED TO PMDS
CONSUMED IN USE
PROPERTY MANAGEMENT AND DISPOSAL SERVICES
SCREENING
$635 MILLION
MILITARY AGENCIES
CIVILIAN AGENCIES
DONATION
$361 MILLION
SALES TO PUBLIC
$82 MILLION
SOLID WASTE SALES

Figure 4. Life history of common use commodities purchased by the Federal Government.[206] Dollar figures represent fiscal year 1970 acquisition cost equivalents.

Unclaimed military property is referred back to the Department of Defense for sale through its own offices.

Nationwide sales figures for fiscal year 1970 indicated that property with an original acquisition cost of $82 million was sold to the public.[212] The gross income from these sales was approximately $17 million. All PMDS expenditures in connection with public sales amounted to $12 per $100 of sales according to agency officials or approximately $2 million. Excess property has been sold to both domestic and foreign customers in the past, according to PMDS personnel.

Table 16 summarizes the quantity and value of scrap materials sold in fiscal year 1970.[213] Of the more than 57,000 tons of excess Federal personal property sold as scrap, (many materials were not weighed so the total weight is not known) paper represented the largest portion at almost 44,000 tons. All paper sold as scrap was generated at GSA operated Federal office buildings throughout the country and would otherwise be disposed of as solid waste if not sold by PMDS to scrap paper dealers. In fact over 19,000 tons of the total wastepaper sold was composed of mixed papers collected from wastebaskets. Table 17 presents a summary of paper waste sales by grade.[214] Note that the value of segregated grades of paper was generally much higher than the corresponding value of mixed paper.

As might be expected, volumes of scrap sold vary significantly from year to year. PMDS figures for fiscal year 1971 indicated that approximately $3.7 million was received from the sale of scrap materials. As previously noted, the income from the sale of excess government property from civil agencies for fiscal year 1971 was $17 million. Accordingly, scrap sales represented about 22 percent of all GSA sales to the public.

As described above, PMDS attempts to achieve maximum utilization of government personal property. PMDS officials contacted during the study expressed confidence that the system works well. One estimate indicated that 99 percent of all items not transferred or donated are eventually sold, donated for direct reuse, or sold as scrap.

In order to readily sell scrap, it must be in a form in demand by the secondary materials industry. Paper, for example, must be relatively free of contaminants and be in a readily transportable form. Much of the scrap that PMDS sells, especially the paper wastes, originates from PBS operated facilities. Although PBS collects the mixed paper generated by building occupants, the agency contends that it cannot enforce separate collection systems necessary to upgrade paper waste quality and thereby increase paper waste sales.

PBS Activities in Relation to Solid Waste

PBS provides janitorial services for more than 10,000 buildings housing Federal agencies.[215] The Federal Government owns approximately 2,500 of these buildings; the others are leased.[216] PBS is responsible for maintaining approximately 187 million sq ft of floor space, including the collection and storage of solid wastes generated within the government's property or leased space. As an indication of the quantity of solid wastes generated, 152,000 tons per year of trash and debris are hauled away from government operations by contractors, according to GSA officials. (This figure does not represent the

TABLE 16
SCALE OF SCRAP (SOLID WASTE) MATERIALS
FISCAL YEAR 1970[213]

Type	Quantity	Total	Total receipts*
Paper (11 grades)	43,942 tons	——	$ 378.510
Metals			
Ferrous	3,700 tons	——	44,241
Nonferrous	5,041 tons	——	606.512
Rubber tires & tubes	32,668 units	$ 34,896	
	72 tons	1,113	
	2 lots	478	36.487
Drums & barrels	4,476 units	6,158	
	3 lots	420	6,578
Batteries	9,378 units	56,472	
	100 tons	10,963	
	1 lot	87	67,522
Bones, meat scraps, grease, etc.	303 tons	11.556	
	2 lots	3,471	
	134 units	603	15,630
Rags, wool, canvas	2,603 tons	178,337	
	1 lot	2,468	180,805
Film	291 tons	——	167,292
Ashes, cinders, soot	23,543 cu yd	——	1,175
Rope	71 tons	——	6,105
Plastics	2,900 units	500	
	1 lot	20	520
All other scrap	1,129 tons	——	107,251
Grand total		——	$1,618,628

* Sales receipts received from contractors.

TABLE 17
SALE OF PAPER WASTES
FISCAL YEAR 1970[214]

Type of paper	Tons	Average price/ton	Sales receipts
Mixed paper	19,137	$ 1.90	$ 36,417
Corrugated (cardboard)	335	18.57	6,233
Books and magazines	8,019	0.58	4,622
Colored ledger	542	10.00	5,420
White ledger	1,109	15.99	17,745
Colored tabs (IBM cards)	4,500	47.01	211,645
Manila tabs (IBM cards)	928	66.58	61,793
Hard white shavings	77	43.72	3,393
File stock	3,930	2.44	9,597
Wet strength	462	1.23	568
Mascerated paper	4,898	4.30	21,072
Total	43,942		$378,515

total Federal generation of solid wastes because not all government-use buildings are served by GSA contractors. For example, post office buildings are managed by the Postal Service.)

The manner in which solid wastes generated in PBS operated buildings are collected and stored within the building has a significant impact on the quantity recovered for salvage sale and the monetary return realized.

Paper Waste Preparation. With the exception of writing the contract under which paper waste is sold, all recovery operations are conducted by PBS. While available space in a given building may determine whether or not mechanical solid waste processing can be installed, the primary basis for decision has been cost-effectiveness. PBS operates baling machines for reclamation of salable paper at 13 locations. Paper wastes from some additional locations where a baler installation was not warranted are being hauled to available balers. Paper wastes have also been bagged for sale at locations where quantities generated would not support a baling operation. Computer room waste and print plant scrap have normally been collected at the source in bags or trays supplied by the paper waste purchaser. Regardless of baler availability, PBS janitorial personnel are instructed to remove obvious contaminants, such as glass, metals, lunch bags, and the like from wastes.

Combined shredding and baling processes have been used to significantly increase the return to the government on paper waste sales. At a Federal Records Center in Pennsylvania, for example, 1,300 tons of cancelled checks each year were originally sold for $54 per ton. With the addition of a $70,000 shredding and baling system, the checks were processed and sold for $85 per ton. Thus, $40,300 more per year was realized, and, assuming an operation and maintenance cost of $10,000 per year, the machine was paid for in less than 3 years.[217]

Those agencies generating classified waste materials present an additional problem. The paper waste must first be processed to render it illegible before being sold to a contractor. A wet pulping system has been used by PBS for this purpose. While the pulped paper was satisfactory from a security standpoint, the material was too wet to attract buyers. Paper wastes processed in this manner were discarded rather than sold for reuse. Interestingly, the wet pulping devices were purchased and installed after an informal market survey by PMDS indicated that the pulped material could not be sold to wastepaper dealers. PBS was opposed to new wet pulping installations because of excessive cost and difficulties encountered in waste disposal. However, security paper destruction equipment has usually been selected by the occupant agency, with little PBS influence.

According to PBS and PMDS officials, an alternative system is now available to satisfactorily shred and pulp classified papers. Using a screw-type dewatering system, this alternative shredding method yields a readily transportable mass of paper fiber that can be reused by paper manufacturers. However, agencies requiring security paper waste processing have now installed the wet pulping process, and no plan exists to replace these systems.

Separate Collection. Experiments are underway at PBS-operated buildings in Denver and Washington, D.C., to initiate separate collection of office wastes. The method undergoing tests entails use of two waste cans in a given area. One can is labeled "trash" while the other is labeled "paper only." An attempt will be made to keep paper wastes separate from other contaminants at the source. The value of the wastepaper will be increased; however, the cost-effectiveness of such a system may not warrant widespread use.

Separate collection has been attempted in PBS buildings according to PBS officials with little success. A small segment of employees disregard the waste can labels and cause undesirable results. Janitorial personnel, whether employees of PBS or contractors, must be carefully instructed and supervised to keep container contents separated. PBS officials also point out that janitors are paid $4.30 per hour, including fringe benefits, and that extra time is necessary for separate collection. This extra cost would probably not be offset by the higher returns for the segregated wastepaper. No definitive study was available, that either supported or disputed this position. However PBS is currently conducting tests to determine its cost-effectiveness.

Where materials are already separated because of the nature of the activity, such as computer room wastes, or used corrugated boxes from the receiving rooms, separate collection has been less expensive and relatively effective according to PMDS officials.

Solid Waste Storage. GSA personnel are divided in their opinions regarding the effects of building design on solid waste recovery efforts. PBS officials indicated that special storage areas to encourage recovery of solid waste from office buildings are not necessary because most buildings receive daily collection service. In addition, PBS stated that large amounts of waste could not be sold because of excessive contamination.

PMDS, on the other hand, indicated that special storage areas in Federal buildings would provide the necessary space to store segregated grades of paper until sufficient quantities were accumulated to warrant collection. For example, it was noted in a speech at the Composting-Waste Recycling Conference in May, 1971, ". . . the Federal Government makes little effort in Washington, D.C., to separate usable paper for recycling on the grounds that government buildings do not have adequate space for the separation, packing, and storage necessary."[218] Furthermore, the lack of adequate space in a building can prevent the installation of a baler or shredder even where desirable.

In the face of all the roadblocks, GSA administrative personnel pointed out that 42 percent of all solid waste generated in PBS-operated buildings in the Washington, D.C., area was sold as scrap for eventual recycle. This high percentage applied only to the particular region involved, reflecting a long-time active interest in such matters by Region III PMDS and PBS staffs. Nationally, only a small percentage of office wastes were sold as scrap. This was true partly because Federal facilities were not as concentrated elsewhere as in Region III. But a contributory factor was the insufficient degree of cooperation between PBS and PMDS on such matters in other regions. PMDS attempts to market wastes that are frequently poorly prepared for recovery by personnel under supervision of the PBS.

Federally Owned vs. Leased Buildings

As previously noted, PBS provided janitorial services in buildings owned and occupied by the Federal Government. In most leased buildings, however, janitorial services were included in the lease rate. PBS had minimal control over solid waste collection and storage practices at leased buildings and thus could not readily assist PMDS in scrap sales in these cases. In order to take better advantage of lease alternatives, legislation was being prepared to provide GSA greater flexibility with respect to planning and contracting for acquisiton of building space.[219] Indications were that more buildings would be leased in the future because economic analysis indicated that leasing of buildings has, in most cases, been less costly than Federal ownership.[220]

Special arrangements can be made with the owner of a leased building to facilitate recovery of wastepaper. In one case, proceeds from the sale of wastepaper generated in a Federally leased building in the Washington, D.C., area were to accrue to the building owner rather than the government. A reduced lease price reflected only the savings in waste collection and disposal costs. The owner was able to keep any excess proceeds. In this manner all sectors of the economy may benefit; the government reduces the lease cost, the building owner may realize added income, and public disposal facilities are not burdened with paper waste.

Recommendations

- *All regional PMDS and PBS offices should actively coordinate their activities that influence solid waste storage, collection, processing, and sales.*

  Since PMDS is empowered to market the materials processed by PBS, PMDS should be consulted as to desired characteristics for the solid waste materials to be salvaged. The PMDS should advise the PBS on storage space and processing equipment requirements to enhance the marketability of reclaimed solid wastes.

- *Building lease contracts arranged by PBS should include the stipulation that solid wastes generated by Federal activities be sold if markets are located by PMDS.*

- *PBS should conduct studies of collection and disposal costs and logistics to define the economic and environmental impact of solid wastes generated in Federally operated buildings and to better assess the feasibility of waste separation for salvage.*

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GLOSSARY

BARK

External natural covering of trees. (Tissue outside the cambium layer). Bark is considered a contaminant in papermaking and is not readily used in other wood product manufacture.

BAUXITE

A naturally occurring mineral ore from which aluminum metal is primarily obtained.

BOARD FOOT

A volume of wood measuring 12 in. by 12 in. by 1 in. thick.

COMMERCIAL FOREST LAND

Forest land that is capable of producing crops of industrial wood and is not withdrawn by law from timber production.

CONSUMABLE PROPERTY

Commodities that are used up in their normal life cycle such as stationery, office supplies, and gasoline.

CULL TREES

Live trees of sawtimber or pole timber size that are unmerchantable because of roughness, rot, or species.

DEPLETION ALLOWANCE

An income tax deduction provided to owners of extractive industries.

EXCESS PROPERTY

There are three classifications:

A. Service excess. Property no longer required by the controlling military service.

B. DOD excess. Property determined to be unneeded by all DOD activities after utilization screening.

C. Government excess. Commodities found to be not needed by DOD or civil agencies.

GROWING STOCK

Live trees of all sizes, meeting specified standards of quality or vigor.

GROUNDWOOD PULP

Paper pulp made from wood by mechanical grinding action with little or no attempt to chemically delignify.

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GRUBBING

Clearing and breaking up land before construction begins.

INVENTORY CONTROL POINT

An organizational unit within a military service or DSA supply system that is responsible for management of a group of specified items.

LIGNIN

The nonfibrous material in wood that bonds cellulose fibers. Lignin is removed from wood in the chemical pulping process to free the fibers.

MINIMUM PROPERTY STANDARDS

Codification of construction requirements that must be met by builders to qualify for Federal Housing Administration approval.

MOTOR CARRIERS

Licensed commercial freight-carrying truckers.

MULCH

A substance spread on the ground to protect roots of plants from extreme temperatures and to suppress weed growth.

NEWSPRINT

Paper used for newspapers. Made largely from mechanical pulp with a small amount of chemical pulp added.

PEAT

Semi-decomposed vegetative matter.

POZZOLAN

A mineral material having the property of forming a cement-like substance in the presence of water.

PULPWOOD

A [soft] wood used in making paper pulp.

PYROLYSIS

Chemical decomposition by the action of heat.

RECLAMATION

See recycle.

RECOVERY

See recycle.

RECYCLE

As used herein, the words recycle, reclamation, salvage, reuse, and resource recovery are interchangeable. They all refer to the practice of obtaining materials from solid wastes for later use in a beneficial manner. Technically, each word carries a specific meaning that is not relevant to the goals of this study.

REPROCESSED WOOL

Wool material made from wool fibers that were previously manufactured but not used by consumers.

REUSE

See recycle.

REUSED WOOL

Reprocessed wool made from wool fibers reclaimed from garments and other items previously used by consumers.

RIPRAP

Rocks or other heavy inert materials placed on the banks of watercourses to prevent scouring.

ROUGHAGE

Coarse, indigestible food, high in bulk, used to stimulate digestion and peristalsis in ruminants.

ROUNDWOOD

Logs, bolts, and other round sections cut from trees.

SALVAGE

See recycle.

SAW KERF

Thickness of slit or cut made by a saw as it cuts through timber.

SAW TIMBER

Live trees of commercial species containing at least one saw log.

SCRAP

Discarded or rejected material or parts of material, resulting from manufacturing or fabricating operations, that are suitable for reprocessing.

SECONDARY MATERIAL

Materials that have either fulfilled their original useful function and can no longer be used in their present form by the owners or those materials that are generated as waste from manufacturing processes.

SLASH

Unused or unusable forest residues killed by timber harvesting, including tree tops, branches, leaves, and small and broken trees and tree parts.

SOLID WASTE

Useless, unwanted, or discarded solid material with insufficient liquid content to be free flowing.

UTILIZATION SCREENING

Review process used by DOD to determine availability of usable property to ensure economical use in lieu of new procurement.

VIRGIN MATERIALS

Materials made wholly or predominantly from raw resources.

WOOD CHIPS

Various sizes of thin slices of wood produced as a result of cutting and usually produced for the purpose of facilitating the pulping process.

APPENDIX A

OFFICIALS INTERVIEWED DURING THIS STUDY

Treasury Department

John Copeland	Staff Member, Office of Tax Analysis
Robert D. Hauxhurst	Space Program Manager, Internal Revenue Service
Leo Ingelsby	Chief, Facilities Branch, Internal Revenue Service
Michael Mitchell	Management Analyst, Facilities Branch, Internal Revenue Service
James Murry	Chief, Publications Branch, Internal Revenue Service
Richard E. Slitor	Assistant Director, Office of Tax Analysis
Burke W. Willsey	Attorney–Advisor, Office of Tax Legislative Council

Federal Highway Administration
Department of Transportation

Ray Abernathy	Administrative Assistant, Office of Research and Development
Howard Anderson	Chief, Environmental Design and Control Division, Office of Research and Development
Marvin Espeland	Staff Engineer, Environmental Development Division, Office of Environmental Policy

Ed Jastremski	Staff Member, Construction and Maintenance Division
Logan Ratliff	Chief, Federal Highways Projects Division, Office of Highway Operations
Rex I. Wells	Chief, Office of Environmental Policy
William Wood	Chief, Construction Methods and Practices Branch, Construction and Maintenance Division

Federal Trade Commission

Roy Buckwalter	Investigator, Division of Textiles and Furs
Edward Finch	Assistant Director, Division of Textiles and Furs, Bureau of Consumer Protection
Robert Freer, Jr.	Staff Member, Office of the General Counsel

Forest Service
Department of Agriculture

John T. Drown	Chief, Forest Products Technology Research, Forest Products and Engineering Research Division
Barry Flamm	Environmental Affairs Coordinator
Norman E. Gould	Staff Assistant to the Director, Timber Management Division, National Forest System
Dwight Hair	Assistant to the Director, Forest Economics and Marketing Research Division

David B. Johnson	Chief, Wood Chemistry and Fiber Products Research, Forest Products and Engineering Research Division
H. R. Josephson	Director, Forest Economics and Marketing Research Division
Vernon W. Meyer	Chief, Forest Products Utilization, Cooperative Forest Management Division, State and Private Forestry
William Mitchell	Librarian
Paul Neff	National Forest System
Dean Quinney, Ph.D.	Chief, Marketing Research Branch, Forest Service Research
Craig Rupp	Multiple Use Coordinator, National Forest System
Herbert C. Story	Associate Deputy Chief, Forest Service Research
John I. Zerbe, Ph.D.	Director, Forest Products and Engineering Research Division, National Forest System

General Accounting Office

John A. Butcher	Member, GAO–EPA Staff
Will Campbell	Member, GAO–Corps of Engineers Staff
Edward A. Densmore, Jr.	Assistant Director, Civil Division
Lloyd Smith	Associate Director, Civil Division
Joseph Valonas	Member, GAO–EPA Staff
Al Voss	Associate Director, Office of Policy and Special Studies

Michael Zimmerman	Supervisory Civil Engineer, GAO–Corps of Engineers Staff

Interstate Commerce Commission

Michael Erenberg	Attorney–Advisor, Office of Proceedings
Edward Margolin	Director, Office of Economics
Donald Shaw	Principal Attorney, Rate Section, Office of Proceedings
Sheldon Silverman	Director, Office of Proceedings
Henry Snavely	Deputy Director, Operating Rights Section, Office of Proceedings
Samuel Towne	Chief, Section of Cost Finding, Bureau of Accounts

National Bureau of Standards
Department of Commerce

Charles T. Mahaffey	Assistant Chief, Codes and Standards Section, Building Research Division, Institute for Applied Technology
Karl F. Plitt	Chief, Products Systems Section, Product Evaluation Technology Division, Institute for Applied Technology
Eric A. Vadelund	Program Manager, Fair Packaging and Labeling Act, Office of Weights and Measures, Institute for Applied Technology
William K. Wilson	Chief, Paper Evaluation Section, Product Evaluation Technology Division, Institute for Applied Technology

Office of Community Development
Department of Housing and Urban Development

Ardee Ames	Executive Administrator, Office of Housing Management
Floyd B. Arms	Director, Program Management and Program Training Division, Office of Renewal Assistance (Now within OCD)
Abram Grossman	Chief, Planning and Engineering Branch, Redevelopment Division, Office of Renewal Assistance, (Now within OCD)
Helen Halbig	Chief, Organization Management Branch, Renewal and Housing Management Division
George Karas	Chief, Program Regulations Division
Robert Reichel	Chief, Codes and Demolition Projects Branch, Special Renewal Division, Office of Renewal Assistance (now within OCD)
S. T. Strang	Assistant Chief, Codes and Demolition Projects Branch, Special Renewal Division, Office of Renewal Assistance, (Now within OCD)
George Wright	Staff Member, Office of the Deputy Under Secretary
Ernest Zupancic	Staff Member, Program Management and Program Training Division, Office of Renewal Assistance, (Now within OCD)

Department of Defense

Major Johan Bayer	Environmental Office, Civil Engineering Group, U.S. Air Force
Col. Herbert Bell	Staff Assistant, Office of Assistant Secretary of Defense (Health and Environment)
George Cunney	Acting Chief, Environmental Office, Directorate of Installations, U.S. Army
Harry Graham	Chief, Materiel Control, Langley Air Force Base, U.S. Air Force
Edward Gramps	Property Utilization Specialist, Defense Supply Agency
John Henley	Construction Representative, Langley Air Force Base, U.S. Air Force
Wayne Hudson	Environmental Protection Engineer, Tactical Air Command, Langley Air Force Base, U.S. Air Force
Col. C. King	Supply Systems Division, U.S. Air Force
Jay Masenich	Defense Supply Agency
George Moss	Supply System Division, U.S. Air Force
Clark Sessions	Industrial Specialist, Field Support Division, Defense Supply Agency
P. Somerville	Chief, Technical and Logistics Services, Disposal Division, Defense Supply Agency
A. Weis	Staff Member, Programs Management Branch, Disposal Division, Defense Supply Agency

United States Postal Service

Herman Dodson	Expert Consultant, Consumer Affairs Department
Arthur Eden	Director, Office of Rates and Classification
Maria Eldridge	Director, Office of Statistical Programs and Standards
David F. Harris	Chief Administrative Officer, Postal Rate Commission
Rita Moroney	Director of Research, Office of the Postmaster General
James R. Thomasen	Deputy Assistant Postmaster General and Comptroller
Stuart Winston	Manager, Rates Division

General Services Administration

Marshall Anderson	Chief, Building Services Branch, Region 3, Public Building Service
Peter Glading	Director, Sales Division, Property Management and Disposal Service
Tom Kopp	Staff Member, Office of Environmental Affairs
Beatrice Lipman	Special Projects Officer, Region 3, Property Management and Disposal Service
Herbert Matthews	Chief, Sales Branch, Region 3, Property Management and Disposal Service
Robert McNolty	Assistant Director, Office of Environmental Affairs

J. Ward	Building Manager, Public Building Service

Department of Commerce

Donald Butts	Pulp and Paperboard Division, Bureau of Domestic Commerce
John Granger	Office of Textile, Bureau of Domestic Commerce
Jacob Levin	Metals Division, Bureau of Domestic Commerce
Leonard Mobley	Office of Textile, Bureau of Domestic Commerce
Howard Post	Pulp and Paperboard Division, Bureau of Domestic Commerce

Department of the Interior

Robert Adams	Staff Member, Statistics Department, Bureau of Mines
Charles Kenahan	Chief, Division of Solid Waste, Bureau of Mines
William Vogley, Ph.D.	Director, Office of Economic Analysis, Office of the Secretary

Congressional Offices

L. Knowles	Staff Member, Joint Economic Committee
S. Pendleton	Staff Member, House Committees on Post Office and Civil Service

National Academy of Sciences

Robert Crozier	Executive Secretary for Committee on Pollution Abatement and Control

Non-Federal Government

James Abert, Ph.D.	Director of Research, National Center for Resource Recovery, Inc.
Blair Bower, Ph.D.	Resources for the Future, Inc.
Phillip L. Buckingham	Director, Solid Waste Services, Southern Railway System
Herschel Cutler, Ph.D.	Transportation Consultant, Institute of Scrap Iron and Steel, Inc.
Ralph O. Foster	Market Analyst, Southern Railway System
James A. Hagen	Director, Market Research Section, Southern Railway System
James Harkins	American Truckers Association
Norman Heller	General Manager, Services Industries, Southern Railway System
H. Jackson	American Textile Manufacturing Institute
Jerome Klaff	President, H. Klaff and Company, Inc.
Howard Ness	National Association of Secondary Materials Industries
James Parker	Textile Fibers and Byproducts Association
Norman Quimby	Resources for the Future, Inc.
Earl Thompson	Textile Fibers and Byproducts Association
Eugene Wingerter	Technical Director, National Solid Waste Management Association

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